RIJKSHERBARIUM

1829–1979

A jubilee volume, edited by

C. KALKMAN

and

P. SMIT

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INTRODUCTION TO THE JUBILEE VOLUME

Our 150th anniversary is commemorated in a rather modest way and it is not our intention to make it an important international event. Hoewever, we decided to dedicate part of Blumea to the jubilee, not only in order to bring our anniversary to the attention of our colleagues abroad, but also in order to bring the historiography of our institute more or less up to date.

The last time the history of the Rijksherbarium was written, was on the occasion of the 100th anniversary of its residence in Leiden. The conservator W. A. Goddijn then published a rather lengthy paper in Dutch and a short summary in French, in the Mededeelingen van 's Rijks Herbarium, nr. 62a/b, 1931. Since that time there have been spectacular changes in the work and position of the institute and in fact the Rijksherbarium of 1979 is not at all like the Rijksherbarium in 1930. It seemed not superfluous, therefore, to publish a new historical survey.

A jubilee is a good opportunity to present historical surveys but it is also a very good opportunity to evaluate the present and to look into the future. Therefore the present state of affairs, and the future as far as can be extrapolated from it, figures heavily in many of the essays of the present volume.

That Dr. P. Smit was willing to act as co-editor for this jubilee volume, was a great relief for me. His critical remarks to the manuscripts have without any doubt increased the quality of the essays and the authors have valued them very much.

Mrs. S. D. Peletier-Bridgwater and dr. P. Baas are acknowledged for their linguistic advices.

Looking back, I think that generally speaking the Rijksherbarium has done a good job. I hope that this will also emerge from the contents of this volume. I trust that we will continue to be useful for systematic botany, pure and applied, scientific and popular, in many different fields.

C. Kalkman, director

C. L. Blume (1796 – 1862)
Director 1829 – 1862
Reproduced from Rumphia 3 (1847)

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THE RIJKSHERBARIUM AND THE SCIENTIFIC AND SOCIAL CONDITIONS WHICH INFLUENCED ITS FOUNDATION

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At the beginning of the nineteenth century the Netherlands lagged behind intellectually when compared with the surrounding countries. This was especially true in the field of natural history.

If we wish to understand the reasons for this backwardness we must remember that during the second half of the eighteenth century the neighbouring countries had started to build and maintain an active trade, whilst the Dutch merchants had secured their capital by investing in those countries, especially in England. The fast decline of our trade with the colonies was one of the consequences of this development.

The study of natural history in those days was stimulated tremendously by the acquisition and exploration of new colonial territories. World-wide expeditions were launched, such as those by Bougainville – with the naturalists Sonnerat and Commerson on board ship – and by Captain Cook who was joined for instance by the Forsters father and son. Those and other expeditions yielded many interesting natural history collections, which were stored in the museums of London and Paris.

Germany and the Netherlands hardly took part in this development. For Germany this was understandable, since the country had no direct connections with the oceans of the world and moreover suffered from a weak political structure. However, for the Netherlands the situation was most peculiar. Botany had flourished here as nowhere else in the world since Carolus Clusius came to the University of Leiden in 1593. It is sufficient to recall such men as Vorstius, Schuyl, Sijen, Boerhaave, Jan and Casper Commelin, and Burman. Even Linnaeus had come to Holland attracted by the vigour of botanical science here and the well-filled botanical gardens. Mainly through the Netherlands the products of the tropical flora had become famous thanks to men like Van Rheede tot Drakestein, Rumphius, Kaempfer, Paul Hermann, Van der Stelt, Van Aerssen van Sommelsdijk, and many others.

The relative backwardness of natural sciences in the Netherlands at the beginning of the nineteenth century must be partly accounted for by the colonial policy of the United East India Company (V.O.C.), adopted in the second half of the eighteenth century. When in that period profits decreased, the governors had shown themselves less and less inclined to admit naturalists into the territories administered by them. This practice was a consequence of the secrecy adopted by the V.O.C. in matters of mercantile interest. The Company could afford to have this policy because it was virtually an independent body which was practically immune from governmental influences from the Republic. Private possession of geographical

maps of territories held by the V.O.C. was a criminal offence. It is hardly surprising therefore that the pursuit of natural history was virtually non-existing in these territories. The major expeditions avoided them and the areas under control of the V.O.C. did in fact belong to the scientifically poorest known in the world. The Spaniard Fernando de Noroña was the only person known to have penetrated the interior of Java for collecting plants (cf. Van Steenis' paper in this volume, particularly his discussion of the period 1753 – 1817).

A peculair link in the development of scientific research was constituted by the 'Bataviaasch Genootschap van Kunsten en Wetenschappen' (Batavian Society of Arts and Sciences) founded in 1778. It is the oldest known scientific society to be established in Asia. As announced at its foundation, natural history was to take an important place in its activities, albeit that such studies were specifically to benefit the mother country. For the study of native plants, a botanical garden was to be established and dried plants and stuffed or otherwise preserved animals were to be studied in a museum. Friedrich Baron von Wurmb was the central figure in the study of natural history at that time. When, however, after only three years, he died, the activities of the Society came virtually to a halt. The low level of activity of the Society lasted until 1814, aided and abetted by the onset of the fourth English war in 1780 which severed the connections of the Dutch mercantile fleet with the mother land.

The year 1811 constitutes an important landmark in this course of events. Java was occupied by the English at that time as some sort of retaliation for the annexation of the Netherlands by France. Sir Thomas Stamford Raffles was installed as Governor-General in Batavia on this occasion.

Raffles held opinions on management and administrative affairs which were completely alien to those fostered by the V.O.C. He carried out a complete reform of government, abolished slavery and established a totally different economic system. He was moreover profoundly interested in the culture and natural history of the territories entrusted to his care. Raffles considered the still existent Batavian Society a useful tool to achieve his ends, i.e. the profound study of native culture and biology; and thanks to his stimulating guidance the Society showed a certain revival.

In 1804 an American physician and botanist by the name of Th. Horsfield had become a member of the Batavian Society. Thanks to the active support of its Council at that time he had succeeded in obtaining permission from the government in Batavia to travel in Java, albeit along pre-defined routes. As early as 1811 he had succeeded in bringing together large collections of plants and animals and this activity was not only appreciated by Raffles but moreover vigorously stimulated. To learn more of the nature of Horsfield's collection we have to wait until 1819.

Apart from Horsfield, other foreign collectors such as the Englishmen Alexander Hare and Joseph Arnold and the Frenchmen Pierre Diard, Alfred Duvancel and Louis Théodore Leschenault de la Tour had been active in the former Dutch Indies under Raffles' government. As a result of their activities Raffles was able to send large collections of biological specimens to Joseph Banks in London. These would later become part of the British Museum (Natural History). The French collectors sent most of their material to Paris. A large part of Horsfield's collections became the property of the Museum of the English East India Company, and Horsfield himself became the curator of this museum after his departure from Java. In this

position he was able to devote the entire rest of his life to the study of his own collections made in the East Indies.

So it happened, that at the beginning of the last century large collections of plants and animals from the Dutch East Indies landed in foreign museums and were described for the first time by foreign scientists (Cf. van Steenis, 1979, p. 57). In 1814, when the French occupation of the Netherlands came to an end, the Dutch became more and more aware that unique opportunities were being lost for our country, and possibly King Willem I, sovereign of the Netherlands and Belgium from 1814, was more aware of this danger than anyone.

King Willem I took a great number of initiatives to raise the Netherlands in particular to a higher level amidst the other countries. He stimulated trade and industry as well as the arts and sciences. This was certainly not an easy task, because, as Jan Romein has put it in his 'History of the Low Countries near the Sea': In those days the Netherlands were a nation of rentiers and paupers, and neither of these are renowned for their great activity.

The Netherlands were greatly impoverished when they emerged from French occupation and there was hardly any industrial development. Moreover, Dutch trade had strongly decreased and given way to English competition. Willem I, during his exile in England, could observe this very clearly, and he had realized how important the colonies could be for the Dutch nation as a supplier of raw material and as a market for industrial products, in the way practised by England and its colonies. The King's interest for our colonial territories can best be understood against this economic background. The foundation of the Handelmaatschappij (Mercantile Society) and the application of the culture system must also be viewed in this light, i.e. for the benefit of the Dutch economic interests.

Soon after the Netherlands had become a free nation again, the King therefore focussed his activities on the East Indies. On April 27th 1816 an important Dutch delegation consisting of amongst others the future Governor-General Baron van der Capellen and the 'Director for Agriculture, Arts and Sciences in the Island of Java and Dependencies', Professor C. G. C. Reinwardt, arrived in Batavia. In the letter inviting Reinwardt to accept this function, written by order of King Willem I we read: 'We must no longer be deprived of the merit of knowing our colonies as thoroughly as our neighbours know theirs ... and the philosophical study of the manners and ways of their inhabitants will develop the safest means to assure Holland of their love and confidence for many years to come' (Smit, 1978, p. 53).

Reinwardt acquitted himself excellently in his task: he organized the school system, especially elementary education, he set up a medical committee, and he introduced vaccination, a service which was headed by his compatriot, the German physician C. L. Blume. Finally, and most interesting for us, Reinwardt also devoted a great deal of attention to science, for according to his instructions he was also to occupy himself with matters such as prospecting for minerals, collecting plants and animals for cabinets of natural curiosities in the Netherlands and studying useful plants and finding methods to propagate them.

With respect to the latter task, just one year after his arrival in Java, Reinwardt suggested to the Governor-General to lay out botanical gardens at Buitenzorg for propagation trials of indigenous plants, in order to find out whether they offered possibilities for economic exploitation. Reinwardt's suggestions met with positive reactions and it is to him that we owe the establishment of 's Lands Plantentuin (The National Botanical Garden) in 1817.

To help enrich the collections of plants and animals in the Netherlands Reinwardt sent large shipments in 1817, 1818, and 1819. Unfortunately all these shipments were lost with the ships carrying them. It was not until 1820 that the first shipment arrived in the mother country.

Meanwhile arrangements had been made in the Netherlands to accomodate these collections. By Royal Decree the National Museum of Natural History was founded in 1820 in Leiden. Here Reinwardt's collections of preserved animals and plants were sent.

The foundation of this National Museum formed part of the strategy of King Willem I for the promotion of science nationally and the large museums of Natural History in Paris and London had served as its model.

How closely the scientific and economic interests were intertwined is clearly shown in a letter written by Temminck in support of the King's plans to found the National Museum of Natural History: ... it is necessary that 'this country shall be able, on a footing of equality with other countries, to boast new discoveries, from which trade and industry may very often derive great and efficacious profit' (Smit, 1978, p. 54). Coenraad Jacob Temminck (1778 – 1858) was the first director of this museum from 1820 until his death.

The success of Reinwardt's mission to the Indies and the need to supply the recently founded Museum of Natural History with materials led in 1820 to yet another Royal Decree, instituting a Natural Science Commission, in the Indies. Its task was to further the scientific knowledge of natural products in the East Indian Archipelago, primarily by collecting plants and animals and by shipping them to the Museum of Natural History in Leiden. It was stipulated that materials collected were the property of the Netherlands and must not be sent to foreign countries without the consent of the minister. Afterwards a condition was added that members of the committee had to send their material to Holland as soon as possible, without first studying it on the spot. All these measures were intended to bring at least natural science in the Netherlands to the same level as in England and France.

However, in spite of all these measures, it remained difficult for Temminck to compete with other countries. Despite all restrictions it happened repeatedly that newly found plants and animals appeared to be known already in Paris. Moreover, Temminck lacked sufficiently trained staff to publish on the material sent to Leiden. The untimely deaths of most of the members of the Natural Science Commission soon after their arrival in the Indies created additional problems. Especially because these Committee members would have been so well qualified to study the plants and animals on their return in the Netherlands.

The German Heinrich Kuhl and the Dutchman Johan Coenraad van Hasselt were the first to be appointed as members of the Natural Science Commission. They were entrusted with the scientific responsibility. The taxidermist G. van Raalten and the draughtsman J. Keultjes had been added to the mission. Towards the end of 1820 the Commission arrived in Buitenzorg, where they were welcomed by Reinwardt. After a short period of preparation in the surroundings of Buitenzorg they embarked on a trip into the interior of Java, collecting everything nature had to offer. After just nine months of uninterrupted labour, Kuhl's physical condition succumbed to the unusual climate, and he died in Buitenzorg on the 14th September in 1821. Van Hasselt subsequently occupied himself for some time sorting out the collections and gave special attention to the plant material.

Meanwhile Reinwardt had been appointed professor of chemistry, botany and

natural history at the university of Leiden at the end of 1819. In this function he succeeded S. J. Brugmans. For several years Reinwardt stayed behind in the East Indies, however, and took part in some expeditions to territories outside Java. In 1822 he was succeeded by C. L. Blume as director of the National Botanical Garden. In the same year Van Hasselt embarked on an expedition into the Bantam region. This was to be his last journey, because in 1823 he fell seriously ill and upon returning to Buitenzorg he died on the 8th September.

In the period which followed there was a close and active collaboration between Van Raalten and Blume in Buitenzorg. Much of the zoological material collected by Kuhl and Van Hasselt was sent to Temminck at the National Museum in Leiden. Most of their botanical specimens, however, came into the hands of Blume. Part of these collections were sent to the Netherlands through the Ministry of Colonial Affairs with as final destination the Museum of Natural History. Following suggestions by Reinwardt, part of the latter material was again sent for study to J. G. S. van Breda, at that time professor of botany at the university of Gent (cf. Smit & Koolen, 1979).

Meanwhile Blume had become a central figure in the collection of East Indian plants. When he left Java in 1826 and returned to the Netherlands he was able to take with him an enormous collection of dried plants. This collection consisted not only of plants brought together by Kuhl and Van Hasselt, but also of large numbers collected by himself and of partial collections made by others. Of the latter the collection made by the German A. Zippelius – a member of the Natural Science Commission after the death of Kuhl and Van Hasselt – was the most important (cf. Van Steenis-Kruseman, 1979). Immediately after his return to Holland, Blume displayed great activity. One of the first things he did was to appeal to King Willem I to finance the publication of his Flora Javae, and this work appeared between 1828 and 1851.

Meanwhile the storing and preservation of the enormous botanical collections Blume had brought with him created a real problem. We may assume that the zoologist Temminck was not extremely interested in so many plants, and on the other hand that Blume – considering his character and personality – was by no means inclined to donate his precious collections to the National Museum.

Whatever the reasons behind it, on March 31, 1829 a Royal Decree was issued, establishing the National (=Rijks-) Herbarium and appointing Blume its first director. For the benefit of political (and scientific) balance it was decreed that the herbarium should be located in Brussels, in several appartments of the Coudenberg convent.

This situation did not last long. When in the summer of 1830, the troubles started which ultimately resulted in the separation of Belgium from the State of the Netherlands, Blume was abroad while P. F. von Siebold happened to be in Belgium. The latter carried with him a large collection of plants brought together during his stay in Japan from 1823 until 1828. Von Siebold intended to add this collection to those of the Rijksherbarium in Brussels under Blume's care. Von Siebold, however, fully realized the great dangers to which both his and Blume's collections would be exposed in such days of turmoil. After consulting Blume's assistant in Brussels – Dr. J. B. Fischer – and the ministry in The Hague it was decided to transfer both collections of plants to Leiden as soon as possible. Thus the Rijksherbarium can be considered to have been transferred to Leiden by October 1, 1830 (cf. Van Steenis-Kruseman, 1979).

When appointed director of the Rijksherbarium Blume was given a special distinction: he was allowed to carry the title of University Professor, although he was not involved in the teaching of botany at Leiden. This task rested on Reinwardt's shoulders in his capacity as professor of botany. This arrangement created a difficult situation which became worse when the collections of plants belonging to Leiden university were merged with those of the Rijksherbarium. The tasks and function of the latter institute were not further defined and delimited in the process (cf. Van Steenis-Kruseman). In article 4 of the 'Instruction of the Rijksherbarium' it was stated that the professor of botany should have completely free access to the herbarium, but the addition 'subject to the responsibility of the director' much diminished the value of this article. Blume interpreted his responsibilities as director of the Rijksherbarium so rigorously, that he was most uncooperative in matters concerning access to the collections in his institute for research purposes. As a consequence there were great difficulties between Blume on the one hand and most of the Dutch botanists on the other and these difficulties lasted until Blume's death in 1862. Thus the Rijksherbarium collections remained unaccessible to most Dutch botanists, and the latter decided to do something about it. In 1845 a number of Reinwardt's ex-students had founded the 'Society for the Dutch Flora'. In 1850, however, it was decided to broaden the scope of its activities to include the study of the flora of the Dutch colonial territories. For this purpose the society was to accumulate its own collections beside those of the Rijksherbarium. The name was changed accordingly into the 'Society for the Flora of the Netherlands and its overseas territories'.

Whatever one may say about Blume, under his guidance the collections increased so rapidly that within a short period the Rijksherbarium could be counted amongst the floristically most important of the world. Important acquisitions were collections by Korthals, Junghuhn, Hasskarl and Von Siebold. Based on these collections, Blume wrote a number of publications on the tropical flora which are still the basis of all our knowledge of the Javanese plant world especially (cf. Van Steenis, 1979).

It may have struck the reader that most of the characters in this narrative were German by birth. This is true for C. L. Blume (1796 – 1862); C. G. C. Reinwardt (1773 – 1854); H. Kuhl (1796 – 1821); F. W. Junghuhn (1809 – 1864); J. K. Hasskarl (1811 – 1894); A. Zippelius (1797 – 1828); and P. F. von Siebold (1796 – 1866). Only two important Dutch collectors can be named to balance this list, viz. J. C. van Hasselt (1797 – 1823) and P. W. Korthals (1807 – 1892). The latter incidentally is one of the very few who in 1837 returned safe and sound to the Netherlands after a six years' stay in the Dutch East Indies. However, he hardly pursued his botanical studies after his retirement in 1843.

All these men lived in a climate of discovery and exploration of colonial territories; of industrialization, trade and competition; and of the search for markets of industrial products as well as for countries supplying raw materials to enable and maintain production. In the beginning of the nineteenth century the Netherlands lagged far behind countries like England and France in this respect. Gradually the country woke up from a period of lethargy, stimulated by a progressive and strong-willed King, and aided by many foreigners, especially Germans. Around the middle of the last century the Netherlands were wide awake and could play their own score in the European social and scientific concert. The great men who stood at the cradle of the Rijksherbarium have effectively contributed to this development and several

of them have paid for it with their lives. We should not forget that because of their activities the great American botanist E. D. Merrill could say on the occasion of the first centenary of the Rijksherbarium: 'The Rijksherbarium in importance and particularly in historical material of great value, ranks with the great herbaria of Europe and America and is one of the few great institutions of its kind in the world ... (its) actual scientific value, with particular reference to Malaysia, (is) unparalleled in any other single botanical institution in the world'. In my opinion these words, expressed 50 years ago, still apply today.

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F. A. W. Miquel (1811 – 1871)
Director 1862 – 1871
Reproduced from M. J. Sirks, Indisch Natuuronderzoek (1915)

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THE RIJKSHERBARIUM, IN PAST AND PRESENT

C. KALKMAN

Rijksherbarium, Leiden

Rijksherbarium, Leiden, University

As is explained in other papers in this jubilee volume (v. Steenis - Kruseman, Smit) it was not on purpose, but by coincidence that the Rijksherbarium came to Leiden. However, Leiden will have been the obvious alternative after Brussels, for Fischer as well as for Von Siebold. There Reinwardt, founder of the Botanical Garden of Buitenzorg (now Bogor, Indonesia), was professor since 1821. There the State Museum of Natural History had been founded in 1820. There was also situated the old and famous Hortus Academicus with which also Von Siebold had his contacts while in Japan and which was the destination of a large shipment of live plants he had brought with him.

Actually, shipping the collections to Leiden meant the return to an earlier plan, discussed at the Ministry in 1827. Possibly at Reinwardt's suggestion the plan had been put forward to merge Blume's collection with those in the possession of Leiden University, then still called the Hogeschool (= High School). The main components of the University herbarium were the Reinwardt collection and the herbarium Van Royen, other important collections (De Vriese, Teysmann, Junghuhn, Splitgerber) only later coming into the possession of the university. Although the Rijksherbarium came to Leiden after all, the combination was not completed before the last year of Miquel's directorate (see the paper by Mrs. Van Steenis in this jubilee volume, p. 29).

The connection of the Rijksherbarium with Leiden university appeared not to be a very successful or peaceful one at first. Blume, the first director, was honoured with the personal title of professor but he had little or nothing to do with the university at Leiden and his relations with the professor of botany (which discipline at the time was not much more than systematics with large remnants of former medicinal botany) were not very friendly or fraternal. Much has been written about Blume's monopolistic vision of the status of the Rijksherbarium and about the resulting conflicts with the government and with colleagues. Although he formally lost the battle and had to acknowledge that his herbarium also had to serve the educational purpose of the university professor of botany, in reality the doors of the Rijksherbarium did not open till after his death.

Even then a formal connection with the university did not materialize. When appointed as Blume's successor, Miquel was professor at Utrecht and he did not want to come to the 'small, fever-ridden town of Leiden', as he put it in a letter to one of his many correspondents. So he remained at Utrecht and did not spend more than a small part of his time at the Rijksherbarium.

Suringar was the first director who at the same time was professor of botany at

Leiden university. The latter position he had filled since 1862 (as extra-ordinarius since 1857) and as such he also supervised the botanical garden. After Miquel's death he also became director of the Rijksherbarium (1871). Conflicts between the two officials could not exist any longer or if there were any, they were fought in one bosom (to borrow a metaphor from Lam in his farewell-speech). From that time the directors of the Rijksherbarium have always been professor or lecturer at the university. This has promoted the connection with this university, probably more than the formal move of 1876 when the Rijksherbarium was placed under the management of the Curators of the university.

In many countries the central (national) herbarium is connected with a large (national) botanical garden. This is not so with the Rijksherbarium which has no direct organizational connection with the Hortus Botanicus of the university and which does not have a garden of its own. Although in the past there have been ample opportunities for a change in this deviating situation, it has never been realized.

The most recent change in the way the Dutch universities are ruled under the University Reform Law (Wet Universitaire Bestuurshervorming) has not made the situation any clearer. The position of the Rijksherbarium as a state institution is difficult to reconcile with the status of 'vakgroep', the lowermost unit in the democratically ruled university hierarchy. Moreover, the massification of the universities makes it more and more difficult for the governing bodies to acknowledge deviating functions like the management of a large collection as equivalent to education and research. The problem will be treated more extensively on p. 25.

Personal views on predecessors.

In this paragraph I will try to give my impressions of the several directors the institute has had, and of the rôles they have played in its development. Since during the greater part of its existence the staff was very small indeed, the personality and the views of the director were of paramount importance for the functioning, the status, and the achievements of the institute.

C. L. Blume was director from the foundation in 1829 to his death in 1862. He was a stubborn man, antagonistic, wanting to preserve his monopoly, suspicious, maybe not always quite honest. However, what the Rijksherbarium is now, a world centre for the systematic botany of the Asian tropics, can be traced back to Blume's activity and perseverance – not to speak of his abilities as a taxonomist. And so our judgment now may be softer than that of many of his contemporaries. At least mine is.

F. A. W. Miquel was director from 1862 tot 1871. I see his directorship as a kind of intermezzo. Its importance lies in the fact that prime minister Thorbecke probably would have resorted to drastic measures if Miquel, in whom he put great trust, had not consented to take the Rijksherbarium under his wing. Even now the personnel was reduced (see p. 18). Miquel opened the collection rooms, made material available to botanists all over the world and although he did not in the least identify himself with the Rijksherbarium like Blume did, but must have considered it as a rather inconveniently placed store-house for herbarium specimens, the institute profited from the radiation of Miquel's great fame and the admiration of his contemporaries. Miquel's view on the function of the Rijksherbarium is illustrated by his remark in an annual report that a botanical library in the Rijksherbarium was superfluous: 'only the books for daily use in the institute must be present, the remainder must be sought in the Library of the University'.

W. F. R. Suringar was nominated ordinary professor of botany succeeding W. H. de Vriese who died in the same year 1862 as Blume. In 1871, after the death of Miquel, he was also appointed director of the Rijksherbarium and, as said above, he was the first to combine the three botanical tasks in the University: professorship, Rijksherbarium, Hortus Botanicus. To my mind he must be seen as the second builder. Suringar's view on the functioning of the institute was very balanced and he managed to build it along several ways during the quartercentury that he was in charge. He also occupied a central position in the, admittedly very small and usually rather provincial, botanical world of the Netherlands.

Suringar's period was a period of steadiness and gradual improvement but possibly he did not recognize the signs of imminent changes in botany which, at least in the later stages of his life, were visible. The attitude of the younger generation of Dutch botanists, many of them his pupils, seems to have been ambiguous: they held Suringar in large esteem and he must have been an amiable man indeed, on the other hand they thought him old-fashioned and hindering progress.

And so the first years of the 20th century, after Suringar's death in 1898, were marked by controversy regarding the Rijksherbarium's position and activities. J. M. Janse had become professor of botany in 1899 and at the same time director of the Rijksherbarium. He did not make a secret of it that he did not aspire at all to the latter position and after some years it was transferred to J. P. Lotsy, reader (called lector in Dutch universities) since 1904 and nominated director of the Rijksherbarium in 1906. Lotsy's time was a time of conflict, with two main elements. In the first place there was the controversy between Lotsy and Hugo de Vries at Amsterdam, a scientific controversy centering around the question of whether plant evolution is by hybridization (Lotsy) or by mutation (De Vries). De Vries was a very powerful man with great authority in and outside Holland, but he did not play a very nice rôle here. He succeeded in frustrating Lotsy's plans to give the taxonomy of the Rijksherbarium a more genetic, more experimental character, and only fear of competition can have been the reason for his actions. When the government refused to build a new herbarium with cultivation grounds, suitable for Lotsy's plans (although Parliament had supported them) Lotsy retired from his office as director of the Rijksherbarium (1909).

A second element in the conflict resulted from the introduction of another kind of botany, eager to replace the old taxonomic discipline. The experimental, physiological, and ecological branches of botany developed outside the Netherlands, especially in Germany (Sachs, Schwendener, Hofmeister, Nägeli, Strasburger, Drude) and they came rather belatedly to Holland. Janse was one of the exponents of the newer disciplines and that must certainly have contributed to his lack of enthusiasm for the directorship of the Rijksherbarium.

So on the one hand botanists in Holland, led by De Vries, did not approve of a Rijksherbarium where more modern, genetical and ecological trends in systematics could receive attention as Lotsy wanted it, on the other hand many botanists of the new-developing disciplines considered a Herbarium to be an old-fashioned hay-loft where innocent people could practise their hobby and where 'real' botanists could receive identifications if they wanted them. The latter attitude has lingered till far into this century and maybe some old-fashioned physiologists still adhere to these ideas.

With J. W. C. Goethart, director after Lotsy left, we enter a period of standstill, partly enforced by the environment, partly the result of Goethart's character. He

had been conservator since 1897, had been acting director twice, and in 1910 he was appointed as director. In the jubilee volume of 1931 he explains why, although he very much believed in Lotsy's approach of systematics, he was willing to stay on while Lotsy left. He was optimistic about the realization of new plans, albeit on a smaller scale than would be preferable, and he counted on the co-operative attitude of the Curators (Board of Governors) of the University and of the professors of botany in the Netherlands. In these expectations he was disappointed, the experimental work was largely frustrated and the external activities of the Rijksherbarium were restricted during his period. On the other hand he gave much thought and time to the perfection of the methods of storing, mounting, fumigating, etc. and this inheritance is still acknowledged in gratitude.

I must confess that Goethart's personality remains some of a mystery to me. According to testimonies of contemporaries and also according to many of his deeds he must have been a gentle person, helpful and kind, not easily to be angered. How the writing, after his retirement, of a sharp address to Parliament under the title 'The attack on our National Herbarium' (1932), fits into the picture, is not very obvious. Possibly he had experienced some conflicts (there are a few letters in the archives pointing in this direction) with the professor of botany (Janse till 1930, afterwards Baas Becking) which had made him afraid of a too heavy involvement of the director of the Rijksherbarium in the university. In 1932 it was already decided that Goethart's successor was to be an (extraordinary) professor, not a reader like Goethart had been. Anyhow, he considered the planned combination of chair of systematic botany and directorship of the Rijksherbarium to be the beginning of the institute's change (degradation, he would have said) into a teaching department and he thought that this would be more or less the end of the collection. Viewed from now, it was all a storm in a tea-cup, maybe it is also an example of someone who at the end of his career cannot adjust himself to necessary changes.

H. J. Lam brought the institute back to life. In 1932 Goethart had been pensioned, the conservator W. A. Goddijn being put in charge, and in 1933 Lam was appointed. He had to come from the Dutch East Indies, where he had been on the staff of the Herbarium Bogoriense since 1919. Lam was trained in the taxonomic school of A. A. Pulle, the well-known professor of systematic botany in Utrecht. In this period the taxonomic action was much more in Utrecht than in Leiden, Pulle being a much more gifted man than Goethart was. In the East Indies Lam had been engaged in the project 'Contributions à l'étude de la Flore des Indes néerlandaises', a series of papers containing revisions of large and small families and genera, designed to become a complete flora of the colony. In this series Lam had contributed the Boerlagellaceae, Burseraceae, Sapotaceae, and Sarcospermaceae and the work had shown him the scientific necessity of monographic systematic work on tropical families and the need for intensifying the floristic inventory of this rich country. Many-sided as he was, he also realized that a herbarium with large and valuable collections as Leiden at the time already possessed, should not restrict itself too much. Working from this vision he succeeded – and after World War II the circumstances were favourable indeed – in attracting a large staff, raising the scientific production, and enlarging the collections. Himself more of a contemplative mind and not at all experiment-loving, he did not bring in the experimental taxonomy (genecology), although in his time this 'new systematics' forcefully entered the scene. He may have had rational arguments for this too, e.g. the opinion that the institutes with the large herbarium collections must search for projects

which need these collections and which cannot easily be done in smaller places. It is certainly true that one does not need a large herbarium and a large library to perform good biosystematic (experimental and karyological) research in a species complex. A monograph of a tropical tree genus, however, can best be made in a well-equiped herbarium with types and other authentics, with a fair representation of material from the natural area of the group and with a good library containing also the old books.

By favour of a more intensive loan system and by the explosive development of the microfiche this is less true now than it was in the thirties and fourties, and then as well as now there are people who overcome all handicaps, but the general trend it was and partly still is. Experimental taxonomy has still hardly entered the Rijksherbarium's research programme, at least as far as Angiosperms are concerned. This discipline was delegated to the Laboratory for Experimental Taxonomy, which was founded when Lam retired in 1962. In a way the chair of systematic botany was divided then: Van Steenis succeeded Lam in the Herbarium, R. Hegnauer was appointed to the chair of Experimental Plant Taxonomy.

The Rijksherbarium owes very much to Lam who was almost thirty years in charge. His main achievement certainly is the increase in research output, collateral to the increase in scientific staff (see p. 18).

So we come to my predecessor, C. G. G. J. van Steenis, who managed to combine during ten years (1962–1972) the offices of chief-editor of Flora Malesiana, professor of botany, and director of the Rijksherbarium. Van Steenis came to Leiden in 1950 after having worked in the Bogor herbarium since 1928. About his life-work Flora Malesiana much has been written on various occasions; it may suffice here to remember that the staff of the Dutch-Indonesian Foundation, which was to make the Flora, was given hospitality in the Rijksherbarium and, when the political situation required it, was incorporated in the staff of the institute.

Especially during the directorship of Van Steenis the combination Rijksherbarium – Flora Malesiana became more and more fixed, also to outsiders. There is a slight danger in this, since people may forget that the activities of the Rijksherbarium staff are wider than Flora Malesiana only, on the other hand it is good for an institute to have a kind of seal, a trade mark by which it is known and renowned.

Fundamental changes in the institute's policy or activities were not made during Van Steenis' directorship. The gradual building of a many-sided scientific staff and the necessary technical and administrative personnel could be continued for some time and when I succeeded Van Steenis in 1972, I took over the responsibility for an institute with about 60 workers of which 25 were botanists. I also entered this job just after the new University Reform Law of 1970 had come into effect. Being a part of the university, the Rijksherbarium had to fall in with the rules set down in this Law. Internally this has worked out beautifully: without much trouble we have managed to find a way in which democratization, i.e. the establishment of a rather broad forum in which decisions are taken, is combined with efficiency which calls for delegation of power. We now have an Institute Council and a Staff Conference taking the important and basic decisions on budget, scientific programme and division of labour. The director's power is distinctly more limited than it was before, with all the pros and cons of course. Under the cons the increase of meetings, conferences, committees, formal and informal, ranks foremost. We try to keep it in hand, but democratic control is not possible without discussion, that means without

meetings. The pros are obvious: the staff is much more committed to its own communally taken decisions than it can be to decisions taken somewhere above. It does not necessarily means that the decisions are better now than before, it does mean that one feels the decisions to be taken partly by oneself.

The scientific staff

As indicated in the above paragraph, a scientific staff started to play a more distinct rôle in Lam's time. Before that, the Rijksherbarium was more or less a one-man show and could to a large extent be identified with its director.

In the first period, Blume's time, the salary of a conservator had to be paid from the subsidy given by the national government for the running of the institute. As a consequence Blume could sometimes appoint such a man, but often the funds were insufficient. On that basis Fischer, Plerot, and Schultes worked for short periods at the Rijksherbarium and so did the 'assistant' Smeets. From the annual reports it is often not quite clear when personnel entered service, what their duties were and when they left. The only botanist staying for a longer period under Blume seems to have been H. van Hall, son of the professor of botany (and other disciplines, esp. 'rural economy') at Groningen, H. C. van Hall, who wrote a Dutch flora, the Flora Belgii Septentrionalis (1825 – 1841). H. van Hall was conservator from 1853 to 1862. He was dismissed when Miquel was appointed and during the ten years of the latter's directorate there was no conservator, the 'staff' consisting of the assistant Smeets only. Suringar apparently had to wait eight years before he got permission to appoint a conservator, viz. J. G. Boerlage, later succeeded by J. W. C. Goethart. Apart from some temporary appointments, possibly mainly with the argument of getting rid of backlogs, there was no other staff till in the period-Lotsy permission was given to appoint a second conservator. The first botanist to occupy the post was W. J. Jongmans, but he stayed only a few years. J. G. Hallier succeeded him as conservator in 1909 and stayed on till 1922. After Goethart had become director, W. A. Goddijn took his place as conservator, and Hallier was succeeded in 1922 by J. Th. Henrard. Miss C. Cool worked in the herbarium as assistant since 1921 and in honorary jobs before that.

So when Lam arrived in 1933, his staff consisted of Henrard and Goddijn, but the latter soon became professor of pharmacography and left the Rijksherbarium. Furthermore there were Miss J. Th. Koster and W. J. Lütjeharms who had succeeded Miss Cool after the latter had died in 1928, as assistant. Miss Koster was soon appointed in a more permanent position as successor of Goddijn, Lütjeharms went to South Africa in 1938 and was succeeded by S. J. van Ooststroom who had been assistant from 1934.

Till the War of 1940 – 1945 there was, consequently, a very limited staff consisting of one or two conservators and one to few assistants. During the war, however, and especially afterwards the staff enlarged considerably till in 1968 the present number of members (24) was reached.

This enlargement of the staff had several causes and several effects. In the first place the Dutch government recognized that scientific research as well as university training would need a large amount of money in order to make up for the arrears resulting from the pre-war economic crisis and from the war itself. Then the number of students increased in a most spectacular way.

For the Rijksherbarium it had the effect that not only a number of scientific collaborators were added to the staff with teaching as an explicit task next to

research, but also a fair number of scientific officers with as their tasks only research and curating. Round 1960 the Flora Malesiana staff, consisting of three scientific officers, one draughtswoman and one secretary, was also transferred to the Rijksherbarium.

The institute not only enlarged, it also changed its character. Slightly schematic, one might say that it changed from an institute where one keeps and names dried plants (where the plants are conserved by a conservator) to an institute where plant-systematic research is performed with the aid of dried plants and other means.

Keeping, naming, cataloguing the collection had been the ratio for the institute, notwithstanding the attempts made by Lotsy in the first place to put plant-systematic research in the front, research for which the plant collection of course is an indispensable tool.

This may seem a play with words only but I think it is in fact true that herbaria (and also museums of natural history, etc.) gradually have shifted their accents. Nowadays, if we talk about task and function of the Rijksherbarium, we mention the plant-systematic research first and recognize that we need to maintain and improve the collection for that purpose. In former times the collection was mentioned first, as clearly witnessed by Goethart's pamphlet referred to above (p. 16).

This change in attitude gradually started before the war with people like Pulle in Utrecht and Lam in Leiden, and it could become quite apparent also in the number of hours spent on research versus curating after the war when the staff increased.

The enlargement of the staff created the possibilities for more comprehensive research programmes than could be executed before. The first start of institutional research programmes is found in Lam's annual report over 1954/55, when for the first time he distinguishes 'divisions' within the institute. In earlier reports the activities of the individual staff-members were listed (in order of seniority!), now the staff was subdivided as follows:

1. Director (Lam)
2. Flora Neerlandica (Van Ooststroom, Reichgelt, 3 honorary collaborators)
3. Division of Tropical Phanerogams (Bakhuizen van den Brink, Van Royen, Kalkman, 1 honorary collaborator)
4. Division of Algology (Koster, Van den Hoek)
5. Division of Mycology (Maas Geesteranus, Bas, 1 honorary collaborator)
6. Division of Plant Sociology and Bryology (Barkman).

Collateral to this is mentioned the staff of 'Flora Malesiana' consisting of Van Steenis, Sleumer, Kern, Leenhouts, and Jacobs.

The grouping of staff in named divisions or departments is to my mind a kind of implicit research programme, in its rawest form and still with a large degree of freedom for the individual researchers.

This development has continued, the research programmes have become more and more important as a basis for decisions and choices, they have been explicitly put into words. Now we try to describe the projects, the research groups have their instructions and the whole lot is listed again and again by all sorts of organizations: the subfaculty, the faculty, the university, the 'Open Deliberations' on biological research as executed by the Royal Academy and the BION-Foundation, the working groups as established within BION, etc.

This is an inevitable consequence of the enlargement of the research input, and as most things on earth it has positive and negative aspects. Researchers will not as easily go adrift under the regime of a programme put in black and white, their

production will be watched, and there are regularly moments of evaluation where they can be called to order (or where they can call themselves to order, a procedure much to be preferred). On the other hand there are ample opportunities now for evasions in administrative embellishments and, worse still, for a situation in which creative researchers are restrained unnecessarily and are forced to do what they not really want to do and possibly do less well.

At present our staff is divided into four 'research groups', working on, respectively:
- tropical Phanerogams
- Cryptogams
- Dutch and European flora
- comparative morphology of Higher plants.

Each of these groups has a written assignment approved by the Subfaculty's Council. Research projects have to be compatible with this group assignment. Project descriptions are made in the group and are discussed (in outline and results) by the Staff Conference of the institute.

Projects number 18 at the moment, but this is not a fixed number. Projects can be terminated, changed, or started by decision of the Staff Conference. By far the largest project is Flora Malesiana in the group Tropical Phanerogams. In the Cryptogams group diversity is largest since this group embraces mycology, algology, bryology, and pteridology.

In a number of papers in this jubilee volume the present research in the several fields is placed in a historical perspective. Together these essays give a good picture of our activities in the past and in the present (and, consequently, also in the future).

The publications

Naturally, in the course of 150 years a large number of scientific, semi-scientific and popular publications have been written by staff-members and other persons connected with the institute. There is no point in giving a full bibliography, even if this were possible, but we must give some attention to the publications, the lasting monument of our activities. In this paragraph and in the appendices on p. 129 we will make a choice which, as with all choices, can be disputed.

For Blume there is not a complete bibliography. In Stafleu & Cowan, Taxonomic Literature 1, 1976, a list of ten books is given of which eight were published wholly or partly after the Rijksherbarium was founded. Indeed, Blume's most important contributions to the taxonomy and floristics of the Dutch East Indies were published during the time he was at Leiden: most of the 42 instalments of the Flora Javae (1828 – 1851, with J. B. Fischer who died in 1832, as co-author), the four volumes of Rumphia (1836 – 1849), and the two volumes of the Museum botanicum Lugduno-Batavum (1849 – 1857).

Miquel's scientific production has been fully listed and annotated in Stafleu's biography in Wentia 16, 1966. From his Rijksherbarium period two books must be noted. In the first place there are the very important Annales Musei Botanici Lugduno-Batavi (4 volumes, 1863 – 1870). Miquel himself wrote most of the contents but others contributed too. One is inclined to consider the Annales as the Rijksherbarium's first journal, but according to a note in Miquel's last annual report (dated three days before his death, when he was already a sick man) he himself considered the book as closed after the fourth and last volume. The second

book to be mentioned is the first part of the Catalogus Musei Botanici Lugduno-Batavi, dealing with the Flora Japonica (1870). This was finished shortly before Miquel's death and what was intended to be a complete catalogue of the collections, never became completed.

Suringar did not write very much and there is no printed bibliography. He wrote mainly on two subjects: algae and Melocactus. In the series he initiated in 1871, Musée de Botanique, he published papers on both subjects and, moreover, he also gave room to two papers by his pupil Melchior Treub, one on the root meristem of Monocotyledons and one on *Selaginella martensii*. After his death his son, J. Valckenier Suringar, edited two instalments on Melocactus (1903, 1905) and then the publication stopped after three volumes.

One of Goethart's merits certainly is the foundation of the first real Rijksherbarium journal, the 'Mededeelingen van 's Rijks Herbarium, Leiden'. From 1910 till 1933 seventy numbers appeared, very diverse in size, each number containing a separate paper with its own pagination (except for the more extensive papers which had to be divided over more numbers of the Mededeelingen).

Soon after his arrival Lam replaced the Mededeelingen by the journal Blumea, in a smaller format and, as journals nowadays do, containing several papers in each instalment. The first instalment was published in August 1934 and the row in the bookcase now shows 24 complete volumes (the present issue being the first part of volume 25) and 6 supplements. The name of the journal remembers the founder of the institute and is in agreement with E. D. Merrill's then recent plea for 'One-name periodicals' (Brittonia 1, 1931, 1–5), warmly supported by Lam.

Persoonia started in December 1959. That the Rijksherbarium became the publisher of a mycological journal, is largely to the credit of Dr. M. A. Donk who after a career in the Dutch East Indies came to Leiden in 1956 where he succeeded, with Lam's wholehearted support, in establishing a mycological centre at the Rijksherbarium. In the mean time the 9th volume is completed and 1 supplement was published. Here too the name is in memory of a botanist whose name is connected with the institute, although he never worked there: C. H. Persoon.

All Rijksherbarium journals, even Miquel's Annales and Suringar's Musée to start with, and in their track the Mededeelingen, Blumea and Persoonia, have always had a mixed character in the sense that they have been founded as a medium for the publications both by staff and outsiders.

Of the 70 numbers of the Mededeelingen about 40% was written by authors from outside the Rijksherbarium, but it must be admitted that expressed in pages the percentage is undoubtedly much lower because of the very thick monographs by Henrard. In Blumea the outside contribution has remained rather evenly one third of the number of papers, in Persoonia the balance shifted in the course of eight volumes from about half to nearly seven tenths of the number of papers coming from outside.

Gorteria is the more sophisticated successor of a stencilled publication which went through 19 numbers under the name Correspondentieblad ten dienste van de floristiek en het vegetatie-onderzoek van Nederland. The first number of the Correspondentieblad appeared in December 1956, the last one which contains the index to the entire journal, in August 1961. This unofficial bulletin was intended to strengthen the communication between those who were interested in the Dutch flora and vegetation. The need for it reflects the revival in this field, the renewed interest in the autochthonous flora which became apparent after the war and which

involved amateurs as well as professionals. The Correspondentieblad was succeeded by a printed journal, of which the first instalment appeared in September 1961. The frequency is 6 numbers per year and in the mean time the 8th volume has been completed (2 years for 1 volume). The name of this journal commemorates David de Gorter (1717 – 1783), a Dutch botanist and the author of the first Dutch flora in which Linnaeus' binary nomenclature was followed (Flora Belgica, 1767). The journal is now published in collaboration with several other botanical institutes in the Netherlands, the editorial responsibility, however, remaining with the Rijksherbarium. Authors from outside the institute are in the majority.

In this paragraph also Flora Malesiana must be mentioned. As said earlier, in the minds of many botanists Flora Malesiana and Rijksherbarium are firmly linked, although a large number of collaborators from many countries are working on the flora and although formally it is a publication jointly sponsored by Lembaga Biologi Nasional (the National Biological Council) at Bogor, Indonesia, and the Rijksherbarium. In Van Steenis' essay in this jubilee volume more data are given about the progress of the flora.

In the wake of the flora itself some other serial publications arose, the Flora Malesiana Bulletin highly apprecitated for the wealth of information it contains, the Identification Lists and the Miscellaneous Records of a more technical nature.

In list b of Appendix 2 (p. 133) the reader will find particulars on some serials with which the Rijksherbarium has or has had connection in some way or other.

Technical, administrative, and other personnel

Mr. J. J. Taffijn is the only lower-ranked member of the personnel about whom I can trace some data from the older times. He was 'bediende' (employee) according to Miquel's annual report over 1862 and he found his task in the more mechanical labour like sorting, mounting, opening packages, etc. He is a 'net werkman' (a tidy labourer), says Miquel approvingly. In later times he also acted as 'custos' of the building and as chief of the non-scientific staff. Since he was pensioned in 1912 after 57 years of faithful service, he must have been appointed under Blume in 1855 and so he has worked under six directors, a record unbroken up till now.

The annual reports written by Blume and Miquel are for the rest quite silent about non-scientific personnel and it may be surmised that most of the time there was only one employee or maybe two.

Probably there was a slight increase under Suringar in the last quarter of the 19th century, but the first data I have been able to find are those of the year 1907/1908. Then there were, apart from Taffijn, three other employees: H. J. S. Nieuwenburg, P. Verstraeten, and H. Steenwijk.

With some fluctuations the non-scientific staff remains on this level till Lam starts re-building the institute. According to his report on September 1st, 1933, there are present: 1 amanuensis for the collections, viz. W. Wieringa who was appointed in 1928 (Amanuensis is in Holland often used for a laboratory attendant, sometimes the civil service rank was also employed for functions outside the laboratory), 1 amanuensis for administration and library (H. J. van der Hee, appointed in 1916), 1 employee as draughtsman and photographer (J. P. M. Biegelaar, appointed in 1921), and 1 employee for work in the collection (H. J. van der Reyden, appointed in 1920). A secretary was honorary at the time, as was rather customary at this time of un-employment, but next year she came in a paid position.

Writing this, I cannot refrain from thinking that I am getting older: I can remember three of these gentlemen from my earlier days in the Herbarium!

From then on, here as well as in the scientific staff, a steady increase in number can be established: eleven in 1947, twenty-three in 1956, thirty-five in 1968. The increase is present in all categories, in the collection managing staff as well as in secretarial and administrative functions, in the domestic department as well as in the studios or the laboratories.

The increase in collection managing staff became a necessity because of three factors: the growth of the collection (the average number of additions, as calculated over several decades, is 35.000 numbers per year), the increase in number of the scientific staff, collaborators and students which caused a multiplication of the internal use, and lastly the growth of the loan connections which enlarged the external use.

Also the library has grown in importance. It is probably the largest botanical library in the Netherlands now, specialized of course in the descriptive branches of systematics, morphology/anatomy, vegetation study, etc. A large number of foreign journals, many of them unique for the country, enhances the value and underlines the national position of the library in its field.

In the course of time there have been many changes and replacements of course and even if it were possible to recover a complete list of personnel from the archives, this would not be very useful. Rather I shall give an outline of the present organization, together with the number of personnel in each part of it.

Administration: 2, viz. the administrator and his assistant.

Management of collections: 11, viz. 1 chief, 3 collection managers each for a specified part of the collection, 3 employees in charge of inserting new and returned specimens, 2 employees for mounting, 1 administrative officer, 1 employee for general services. N.B. Most of the mounting is done by persons posted at the Rijksherbarium by the Municipality of Leiden under a Social Employment Scheme.

Library: 5, viz. the librarian, 2 assistants, 1 employee for general services, xerox, etc. one vacancy.

Secretaries: 5, of which 1 vacancy.

Draughtsmen and -women: 4.

Photographer: 1.

Domestic service, including maintenance of building and instruments: 6.

Scientific assistants: 4, viz. 2 analysts, 1 botanical assistant, and 1 administrative officer for documentation.

Under the prevailing rules for the Civil Service these people are almost all in permanent positions. That means that, unless the number of positions increases, changes in the organization can only be made when there is a vacancy in the right quarters. Lately we have also been confronted with restrictive measures and it is no longer certain that vacancies can be filled. This makes the organization less flexible than desirable and new tasks like e.g. electronic data processing in the herbarium, are difficult to realize when wanted.

Compared with other herbaria, we are certainly not badly off with our auxiliary staff. To a fairly large extent we can follow the axiom that a trained scientist must not spend much time doing jobs which a technician, a secretary or a photographer can do at least as well. To be really efficient in this respect, however, we would require another dozen positions. Cost-consciousness not being one of the prevailing

characteristics of governmental research institutes, the idea of adding this dozen does not appeal very much to the pertinent higher levels.

Teaching

At least since the times of Suringar teaching plant systematics and related subjects has been recognized as a task the Rijksherbarium should not evade. Formerly it was only in the person of the director (ordinary or extraordinary professor or reader) that the teaching was concentrated but, als already mentioned on p. 18, when a staff developed teaching jobs were also assigned to several of its members.

Up till 1933 we have hardly any data about the connection between students and the Rijksherbarium. From time to time a remark is made in a report about a student working in the herbarium and it may be assumed that at least under Suringar, Lotsy, and Goethart, this has occurred regularly although not very often.

In 1933 Lam came and made the annual reports more informative. From that time on we have more insight in the teaching task of the institute. Lam obviously regarded teaching as belonging to the institute's task and not only as the assignment of the professor. So in teaching as well as in other fields, 1933 marks a clear break in views and activities. From that year till in the sixties the pattern of the Rijksherbarium's participation in the university's teaching has remained virtually the same. There were lectures given to younger and older students by the professor and later also by lecturers of some rank or other. The following can be mentioned: J. Th. Henrard docent from 1940 to 1946, S. J. van Ooststroom lector from 1951 to 1953, J. J. Barkman docent from 1953 to 1973, H. C. D. de Wit lector from 1953 to 1959, M. A. Donk docent from 1956 to 1972, C. Kalkman docent from 1960 to 1972, C. G. G. J. van Steenis professor on a special chair founded by the University Fund Leiden from 1953 to 1962, Miss A. J. den Held docent from 1973 to 1975 (lector is more or less equivalent to the British reader, docent is a general term for a lecturing assignment given by the Minister of Education).

Next to the lectures there were practicals, courses of either a half day each week during the whole year, or fulltime during some 4 to 6 weeks. For the young student, in biology as well as in pharmacy, these practicals contained a survey of the Plant Kingdom, for older students more specialized subjects were taught.

Excursions of various kinds, in the Netherlands and other countries of Europe, were part of the programme and so were the 'kaswandelingen' (literally: walks in the greenhouse), where small groups of students went into the botanical garden and its greenhouses to learn about plants according to the whims of the weather and the tutor.

After the 'candidaats' examination (after some 4 years) Dutch biology students came into contact with the research in the different departments. According to their choice they studied subjects for periods from 6 to 12 months, also in the Rijksherbarium. The first subjects given by Lam consisted mostly of the identification of collections but gradually the subjects became more sophisticated and soon the students were doing real research (under guidance of course) in the fields of taxonomy, plant-geography, morphology or phylogeny. The numbers of candidates doing a subject in the Rijksherbarium did not become very high: in his first three years Lam mentions 3 to 5 students per year. After 1950 the number increased and 6 to 10 students entered each year.

In 1963 there was a change, connected with the foundation of the Laboratory for Experimental Taxonomy and the nomination of Professor Hegnauer (see p. 17). It was agreed that the teaching of the Rijksherbarium would be restricted to a four weeks' course in Angiosperm taxonomy for 3rd year's students, some excursions, lectures for older students and candidate's subjects. The other parts of the subfaculty's programme in plant systematics were allotted to the new laboratory.

Later still there have been all kinds of changes and adjustments. The division of labour with the Laboratory for Experimental Taxonomy has been adapted and the Rijksherbarium is now involved in all phases of the study in biology although certainly more heavily in the later and more specialized phases. The full programme now contains:

lectures in the propaedeutical phase;
practical courses of 3 or 5 weeks (full-time) in Angiosperm taxonomy, floristic plant-geography, algology, mycology, bryology, pteridology, palynology, not all of them given each year;
excursions, often in collaboration with the Laboratory for Experimental Taxonomy and/or with zoologists;
lectures and seminars with specialized topics, for advanced students;
research assignments (candidate's subjects), as far as possible fitting into the institute's research programme and coached by one of the staff-members.

In the older times the conflicting interests of 'Collection' and 'Teaching' have often been stressed in annual reports, letters, etc. The main difficulty seems to have been: is it admissable to give valuable herbarium material from the State's collections into the hands of students for the purpose of teaching? The changes in botany, the changes in teaching aims and methods, and possibly also the growth of the collection have made this no longer a pertinent question and the answer may be yes or no, depending on the purpose. Routine practicals will use specially collected or specially cultivated specimens, not the rare, valuable, unique herbarium specimens. The candidates, however, are involved in real research and they make use of the collections in the same way as the staff.

The conflicting interests go much deeper nowadays and they are related to the position of the Rijksherbarium in the university about which some remarks were made already on p. 14. Most people will agree that teaching, on advanced level at least, is an essential activity for a research institute. The reasons may be mixed, partly egocentric (one must take care that a younger generation can fall in when the older one retires), partly altruïstic (interested students must get the opportunity to participate in this fascinating branch of research). That does not, however, necessarily mean that research institutes must be placed in universities and there are very many examples, also in the Netherlands, of research institutes which have agreements, written or not, with universities regarding the intake of students.

In recent years, under the influence of a tremendous increase in the number of students, the Dutch universities have been forced to admit that teaching is their first and major assignment. It is quite obsolete and untrue now to consider the university as a temple of science with research as its foremost task. Certainly, research must be done in order to keep the teaching on a scientific level, but the university of today is no longer the perfect place for research, it is just a place where research is (still) possible.

Because of this and of the consideration, that the care for collections is a rare and

alien function in universities, at least in Holland but probably in most other countries as well, doubts have been expressed in some quarters whether in the present circumstances the university is the most sensible place for the Rijksherbarium. However, after more than a century within the university, one does not change so easily.

The buildings

In Mrs. Van Steenis' essay in this jubilee volume we are told in which buildings the collections have been housed during the 150 years. The longest period has been spent in Rapenburg 33 and annexes. There we were located till the new building in Nonnensteeg 1, next to the Botanical Laboratory and the Hortus Botanicus was ready at the end of 1912. A 'temporary' annexe at the other side of the Hortus was opened in 1956, but the building remained too small and the move in 1964 to Schelpenkade 6 came as a relief, although the carpological collections and the material in spirit had to be put away in another place (they have only recently been moved to the Schelpenkade). The new building was not really new, it is an old textile factory renovated to suit the new purpose. Although at the time we fully realized that the security in the new building was a very weak point, especially because of fire hazards, we had to accept it since working in the Nonnensteeg had become impossible. And moreover: it was only a 'provisorium' they said, for some 7, 8 years, 10 at the most.

Recent history causes a less optimistic vision. In 1978 a plan for a new building, to be built immediately after the planned new Biological Laboratory, was rejected before it could come to full flower, and at the moment I am writing this paragraph there is no prospect at all for a new building in anything like the 'near' future. As far as we can see now, we will be in the factory for another twenty years.

Whether this is the right way to house one of the nation's valuable scientific collections....? In my opinion this is a rhetorical question and my conclusion can only be that the Rijksherbarium has become the victim of the postwar enlargement of the universities which made necessary the construction of many new buildings in order to keep pace with the vastly increasing number of students in most disciplines. In the race for priority on the building list an institute of our signature, with as main functions research (and not even vital for the national economy!) and collection management, can hardly be expected to be a winner.

I realize that this is a sombre note to end this story but it would be unrealistic not to mention the problems we are facing at the present time. In the light of the history they tend to loose some of their sharp edges too. The Rijksherbarium has had difficult times more often and has survived nevertheless. After a period of growth we have now entered less prosperous times and it is clear that not all our ideals will be fulfilled. However, the Rijksherbarium may be old, it is also very much alive and I am quite confident as to its future.

W. F. R. Suringar (1832–1898)
Director 1871–1898
Photo in archives Rijksherbarium

J. M. Janse (1860 – 1938)
Director 1899 – 1906
Photo from a painting by L. Hartz, 1930

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THE COLLECTIONS OF THE RIJKSHERBARIUM

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1. INTRODUCTION

Herbals and herbaria for scientific purposes have been made from the 16th century. They were private property long before the time of the foundation of most institutional herbaria, in which they are now, as far as they are still intact, preserved. The oldest, when in book-form, are of course kept apart. Those mounted on loose sheets were treated in different ways and were subsequently incorporated and filed in the general herbarium, as for instance those of Van Royen at Leiden, Burman f. at Geneva, R. Brown at the British Museum and the Hooker and Bentham collections at Kew. In other instances they were kept apart and preserved as a separate unit, in view of the fact that they represented the authentic standard works of authorities, for example the herbaria of Jussieu, Lamarck, and Baillon at Paris, that of the DeCandolles at Geneva, and Willdenow at Berlin. For this purpose the Wallich collections at Kew were, in recent years, re-assembled as a separate unit.

Except for the Herbarium in Paris, which was founded as early as 1635, other university or national herbaria were founded much later, e.g. that of the British Museum (Natural History) in 1753 (harbouring several famous herbals from Sloane, Petiver, etc.), Copenhagen in 1759, of the University of Cambridge in 1761, Uppsala in 1785, Berlin in 1815, Geneva in 1817 (now comprising the combined herbaria of Delessert and Boissier, and the separate herbarium of the DeCandolles), Petersburg (now Leningrad) in 1823, the Rijksherbarium at Brussels in 1829, and the Herbarium at Kew as late as 1853.

The University at Leiden, in those days still called 'Leidsche Hoogeschool', had early collections of dried plants under the name of 'Herbarium Academicum Lugdunum', stored in a room of a Hortus building. It contained some of the old herbals as mentioned below (others coming to Leiden much later), and the Herb. van Royen, now incorporated in the general collection of the Rijksherbarium. The Van Royen herbarium, which contains many references to Hermann's herbarium (see p. 34), was seen by Linnaeus, and must be considered one of the treasures of the institute.

After the transfer of the Rijksherbarium (i.e. the State Herbarium) from Brussels to Leiden in 1830 (see further details on p. 30), it was officially decided to unite it with the Academy collections in 1832.

The '*Ontwerp Instructie*' *1832* for the director of the Rijksherbarium, in which this was stated, sets down that the institute has to be open to students of botany

* This essay could hardly have been written without the cooperation of botanists and technical staff in answering my numerous questions: I wish to express my sincere thanks to all of them.

under adequate supervision. The professor of botany and eventually students with a recommendation from the professor, could be admitted as long as no damage was done to the collection. The professor of botany could, in addition, borrow specimens for his own special studies for a specified time and against receipt. The incorporation of the early Herbarium of the 'Hoogeschool' was officially supposed to have materialized in 1838. In reality it was as late as 1871 before the last parcels were transferred from the Hortus, certainly partly due to the fact that Junghuhn and others stipulated that they did not want their collections placed under the supervision of Blume. As Blume died in 1862, it might be that large herbaria, as e.g. Herb. Reinwardt and his Herb. variorum botanicorum, and earlier Herb. Splitgerber, were temporarily stored in the Hortus building for reasons of space.

In 1872 the collections of the 'Botanische Vereeniging' (Dutch Botanical Society) were deposited in the Rijksherbarium (with an interruption from 1912 – 1925), nine years later than Miquel proposed in a letter to L. H. Buse, as the conservator was willing to supervise that collection at his home[20]. The exotics were presented, including also Cape plants.

In 1910 this example was followed by the 'Nederlandsche Mycologische Vereeniging' (Dutch Mycological Society) which presented its collection to the Rijksherbarium.

Besides by the uniting of several private and society-owned herbaria, institutional herbaria grow by acquisitions obtained by gifts (legacies a.o.), collections made by their staff and other government officials, exchange of specimens with other herbaria and owners of private collections, and purchase of private collections or sets offered for sale by naturalist explorers.

2. THE HOUSING OF THE RIJKSHERBARIUM

a. In Brussels (1829 – 1830)

By a Royal Decree of March 31, 1829, the foundation of a Herbarium in Brussels (at the time the capital of the Netherlands, which at that stage still included present-day Belgium) became a fact. From 1829 – 30 it was housed at 8 – 12, Rue de Namur (formerly Rue de Coudenberg)[1], under the direction of C. L. Blume.

The collections were made up of those made by Blume himself in Java and Noesa Kambangan, by the members of the 'Natuurkundige Commissie' (Natural Science Commission): Kuhl, Van Hasselt, Zipelius (unfortunately with separately kept labels), and other collectors in the Dutch East Indies.

In June 1830, the German physician Ph. F. von Siebold sent two cases with dried plants, seeds, and wood samples collected during his stay in Japan (in Dutch employ on the Japanese isle of Deshima), to Brussels.

Shortly afterwards, Blume went abroad, just before the outbreak of the revolt which resulted in the same year in the separation of the Southern Netherlands (i.e. Belgium). Von Siebold, fearing for the safety of his collections during riots, contacted Mr. van Ewyck, a high government official at the Hague, and got his authorization to move his collection from Brussels to Leiden. After consultation with Blume's assistant, Dr. J. B. Fischer, all collections of the Rijksherbarium together with Von Siebold's material were packed into cases and forwarded to Ghent, from where they were shipped to Leiden. Despite the interest which mutineers showed in the shipment, Von Siebold saw to it that the cargo was safely delivered at Leiden.[1]

b. In Leiden (1830-hodie)

Since October 1830 the Brussels collections had been deposited in a Hortus building (officially since 1832). In 1837 the rebuilding of the Museum van Oudheden was begun and in 1839 the herbarium collections were transferred to the ground floor of that Museum (Kabinet voor Pleisterbeelden), situated on the Rapenburg 33 (at present housing the Institute for Tropical Medicine).[23] Unfortunately no funds were available for the substitution of the covers of the collections and nothing could be done about internal reorganization.

During Blume's directorship of over thirty years, the space in the building (3 rooms) became much too tight, and not only that: the yearly reports recorded complaints of the humidity of the building, not to speak of leakages which became a lasting problem, especially from the 1850s onwards.

In 1864, Miquel received permission to use the first floor of the building on the Rapenburg.

Several plans for a new building in close vicinity to the Botanical Institute and the Hortus were made and discarded (nothing new under the sun). In 1903 a plan was made which finally resulted in the compound in the Nonnensteeg. Lotsy's plan of a more elaborate building with possibilities to expand, and with an attached experimental garden, all on the outskirts of Leiden, was discarded. The faculty of Leiden University was opposed to it, and Hugo de Vries, the world-famous and influential professor of Amsterdam University, had discussions with the Minister and members of Parliament, to prevent the acceptance of Lotsy's master plan. A not very elegant way to thwart a rival. Lotsy took the consequences and handed in his resignation in 1909.

In 1911–13 the transfer to the Nonnensteeg took place, a considerable improvement, but not for eternity. Under H. J. Lam the situation became once more chaotic, with the herbarium boxes crowding corridors and staircases.

At present, from the end of 1964 onwards, the Herbarium is housed in a renovated factory complex in the Schelpenkade, euphemistically called the 'Provisorium', with much more space, but not satisfactory with regard to full fire prevention safeguards. The final (?) solution is planned in the 'Leeuwenhoek', where, in the future, government budgetary means permitting, the beta institutes of Leiden University will be housed together on a plot situated in the western suburbs of the town. However, differences of opinion are once more being heard and speculations might be better left alone.

3. HERBARIUM POLICY

In 1830 the collections of the Rijksherbarium consisted of plants from the Dutch East Indies and Japan, two regions of the world which for years to come, would influence the study of the material. Once started with such a nucleus, formed thanks to the (rather late) Dutch interest in the scientific exploration of their colonies and settlements, it was a historically given opportunity to publish on those regions. Any botanist interested in those regions had, and has, to take the Leiden collections into account.

As regards the first director, Dr. C. L. Blume, a much disputed personality, a few remarks might be to the point. Whatever has been said to his discredit, one thing is certain, and that is that he was possibly the only botanist (and a devoted, not to say

inspired one) in his period who had *no* private herbarium and held himself entitled to stress the fact that all collections made at the government's expense were government property and that their only just place was in the Rijksherbarium. Nowadays, there is hardly a Herbarium anywhere of which the staff is permitted to have a private collection, but the idea was heresy to botanists of Blume's time. It was certainly the cause of much controversy, the more so as Blume was an autocratic solitaire, who was rather averse to admitting certain colleagues to the collections and even more to their borrowing material to use at their homes. The latter practice, which at that time was considered normal, has, of course, been almost abandoned today.

In 1862, after Blume's death, F. A. W. Miquel, professor at Utrecht, was appointed director without cost to the State. This implied that he could be only part-time at Leiden; it had to be two days weekly at least. As almost simultaneously the conservator, H. van Hall, was dismissed for obscure reasons after nine years' service (Miquel said he had no hand in it so let us give him the benefit of the doubt), the permanent higher-trained personnel of the Herbarium consisted in fact only of the assistant Smeets, a pharmacist who had been appointed under Blume.

Miquel was a very different person from Blume, with a different policy with regard to the management of the Herbarium. His relations with colleague botanists and the government were far more congenial than they were under Blume. Blume had been in charge for over thirty years, during which, especially in the latter years, he had been involved in confrontations and controversies with colleagues and the government. Miquel was only given nine years (†1871) and in that period he had lavishly distributed duplicates of the collections, even to the extent that precious little was left for his successor Suringar as materials for exchange. The original source of the many duplicates had dried up considerably after the foundation of the Herbarium Bogoriense (1844) by the diligent Curator of the Buitenzorg Botanic Gardens, J. E. Teysmann, much to the annoyance of Blume, who saw his monopoly threatened, and not unjustly so.

Subsequent directors, Suringar, and later Goethart, had, for this reason, to spend more money on buying collections.

This problem of shortage of exchange material persisted throughout the thirties of this century. Lam successfully initiated expeditions to the tropics by botanists on his staff, which since that time, and especially after the fifties, has become a routine activity. An auxiliary purpose was to familiarize specialists with their groups in the field.

Presented acquisitions come chiefly from private donations by Netherlands botanists who want a safe deposit for their collections of the Netherlands and Europe, duplicates from Herbarium Bogoriense, according to the agreement made between Teysmann and Miquel, and furthermore, from individual persons or institutions who want their material pre-identified, largely from the tropics. This service is an important source of acquisitions, chiefly from the forest services, at Bangkok, Kepong, Kuching, Sandakan in Malaysia, and Lae in Papua New Guinea, while there is a regular exchange with Manila. A great attraction for all of them is the presence in Leiden of its specialists who gain through the years expert knowledge of an increasing number of families.

Also missionaries, anthropologists, phytochemists and many amateur collectors like to have the names of their plants identified and know that the Leiden staff is willing to provide them within a reasonable time, which has a most stimulating effect.

4. CONTENTS AND ACQUISITIONS

In this chapter a survey is made of the growth of the collections in which only the main items can be specified. The existing sources do not permit me to compile such a meticulous specification as was done formerly by Urban for the Berlin Herbarium. During the war years an effort was made by Mr. Sinia to list the names of collectors of plants in the Rijksherbarium, based on the odd scanning of the collections, but this is not suitable for publication.

I have arranged the main acquisitions chronologically, under the various directorates, but I have made an exception for old herbals and old herbaria which are of outstanding interest and are mostly kept separately.

a. Old Herbals, Herbaria etc. [2–9, 24–25]

Most of these collections, certainly the herbaria on loose sheets, will have been kept in the Hortus Academicus room. With the older herbals it was a different story. Rauwolf's herbal, being books, was originally in the University Library, but later given on permanent loan to the Rijksherbarium. The Herb. Simon d'Oignies was transferred from the Koninklijke Bibliotheek (Royal Library at the Hague) in 1868 at the request of Miquel, and the Herbarium of David de Gorter came to Leiden in 1922 as a permanent loan (later presented) from the 'Museum der Vereeniging tot Beoefening van Overijsselsch Regt en Geschiedenis te Zwolle'. The more important ones are:

Herb. Rauwolf[2], made by Leonhart Rauwolf, doctor at Augsburg, Germany; it is one of the oldest scientific herbals from the 16th century. It consists of specimens collected by himself during travels in Italy and Switzerland, the south of France and from the Mediterranean and Near East (Tripolis, Lebanon, Euphrates, etc.). It is in reasonable condition, although partly damaged and with some pages missing, presumably cut out by unscrupulous botanists. It consists of four books, three quarto and one folio. It formed part of the legacy of I. Vossius and was bought in London in 1689. It had been presented to Vossius by Queen Christina of Sweden, whom he tutored. It is supposed to have been part of the war-booty which the Swedes took from the Germans during the 30-year war. It formed the base of Gronovius' 'Flora orientalis' (Lugd. Bat. 1755), while towards the end of the 19th century Ludovic Legré studied the contents for his paper on the knowledge of the botany of the Provence in the 16th century.

Herb. En Tibi, another folio volume, is, judging from the used nomenclature also from the 16th century. It formed part of Vossius collections too. It contains a.o. boreal and Mediterranean plants and is possibly of Italian origin. A card index of its contents is in the Rijksherbarium; c. 433 nos.

Herb. Breyne[4], made by the merchant Jacob Breyne, at Danzig, 1659; it consists of three volumes. Its value lies mainly in the accurately mentioned Prussian localities in two of them. They are, however, in a bad state. It is not known how it came to Leiden.

Herb. Boccone[2], in book-form, contains plants from Sicily, Malta, etc. (1674). It belongs to Boccone's book, 'Icones et descriptiones rariorum plantarum Siciliae, Melitae, Galliae et Italiae.' Proofs of the plates are included.

In the old archives of the Rijksherbarium I found a list comprising several items of the *Herb. Hieronymous van Beverningh*, including Cape plants from P. Hermann, Italian plants coll. 1664 by D. van Meeuwen (pres. 1676), *Herb. D. Boccone* in Sicilia

(!), Java plants from Cleyer (1676), ten Rhyne Cape plants, and J. Breyne specimens. As the list is in an old cover stamped 'Acad. Lugd.', it seems that his herbarium came to Leiden; Van Beverningh was a Curator of the 'Hoogeschool' who died in 1690. With the exception of Boccone's herbarium the other plants are probably dispersed through the general collection of the Rijksherbarium.

Herb. Hermann[5], from Ceylon, collected 1672 – 79, by P. Hermann, consists of two volumes in book-form, in very good condition. It is not the only herbarium in existence, as another one is in the British Museum (Natural History) in London, and a folio volume containing 92 plants of the Cape and Ceylon is in the 'Forschungsbibliothek' at Gotha, D.D.R.[24] The one used by J. Burman for his 'Thesaurus zeylanicus' had originally been sent to J. Commelin in Amsterdam. After Burman's death it came into the possession of Benj. Delessert, who bequeathed his herbaria to Geneva and his library to the 'Institut de France' in Paris. Hermann's herbarium, being bound in a folio volume, was regarded as a book and given to the 'Institut'.[25] Linnaeus based his 'Flora Zeylanica' on the British Museum material, but some of the species are not represented there and a number of species in this book and in his 'Species plantarum' have been taken from Burman's descriptions and drawings.

Herb. van Royen[2], made by Professor Adriaan van Royen of Leiden (1732 – 54), is, contrary to the old herbals, not kept apart. It is inserted in the general collection of the Rijksherbarium. It has labels clearly giving its origin, and contains many references to Hermann's herbarium. Some *algae* and many *bryophytes* are included in it. It was seen by Linnaeus (types!). It contains Thunberg specimens (belonging to his 'Flora Japonica').

So-called *Herb. Boerhaave.*[2] This is of uncertain origin; opinions differ. It is considered as having possibly been made in the Hortus Academicus after 1740.

In the old archives of the Rijksherbarium the name Meerburg was found on lists together with Van Royen plants. *N. Meerburgh* was a well-known Curator of the Hortus Academicus in D. van Royen's time (nephew and successor of A. van Royen). He was in possession of a herbarium.[3] Sheets with the name Meerburgh are occasionally found in the Rijksherbarium collections.

Herb. de Gorter[6], was after careful study, identified with certainty as having been made by Prof. David de Gorter in the 18th century. It contains 1346 specimens, partly without localities, partly from plants cultivated in gardens, Russian and Siberian plants collected by himself, but also by others, e.g. Lerche, Gerber, specimens from Persia, Italy, etc. Plants from the Netherlands of importance for Dutch floristics number only 33, and are extensively discussed by Van Ooststroom. The latter supposes that a herbarium of exclusively Dutch plants will have been in existence.

Herb. Simon d'Oignies[2] was acquired by the government in 1868, (see p. 33), but is dated 1780; it consists of 5 volumes. It is typical of its time, the dried material, as in the Gorter herbarium, being adorned with pictured flower-pots, bows and suchlike, giving the specimens a more romantic look.

Joseph Gaertner's Carpologica[7] contains a number of types (as well as the set with Herb. Banks in the British Mus. Nat. Hist.) and must date from the Hortus Academicus Herbarium. The fruits and seeds had been collected by himself during his European travels, but also by other collectors, e.g. ex Hort. Lugd. Bat. He was a friend of David van Royen, who was in possession of a carpological cabinet also. Gaertner's collection was used for his famous book 'De Fructibus et Seminibus

Plantarum', the 3rd and last volume published by his son. The material, mostly in glass tubes is badly labelled; it is not certain that it was ever a complete collection, the main set being at Tübingen.

The oldest known plant collection of Surinam, bound in a volume resembling those of Hermann's, and certainly made before 1695, erroneously marked on its back: Herb: Viv: Promont. Bonae Spei Vol: 1, was also in Leiden.[8] It was given to Herb. Utrecht by Lam who considered it a more appropriate place, as the Utrecht Institute specialized in the flora of the West Indies.

There are several other herbaria, mostly in book-form and partly of uncertain origin, including a '*Museum Cryptogamicum*' (3 vols. of Musci and Lichens).

There are also several 19th century Japanese collections, some bundled and with a label that they were made by Von Siebold's pupils (coll. 1823–30), others in book-form, some folded accordion-wise, *Herb. bot. Kaizo* in 4 vols, and *Herb. Ito Keiske* (see p. 41), most of them in poor condition.[9] Occasionally Miquel referred to them.

It is mostly very time-consuming work, even for a botanist with a historical interest, and an eye for graphology and methods, such as Van Ooststroom, to ascertain the origin and former owner[s).

b. Directorate of C. L. Blume (1829–1862)

Blume was an eminent and prolific author of botanical works[26], but the directorship implied more than that. One of the first tasks of the Rijksherbarium (as stipulated in the Instructions 1832), was to have a catalogue of the collections made. This is certainly not a clerical task for a non-botanist. It implies identifications as to the family, genera, and species. The required yearly reports[10] to the Minister of Interior Affairs were evidently appended by lists to show the progress of the work with the request to return them as soon as possible.

This time-consuming work on the catalogue, i.e. on the identification and the arranging of the collections, was done in succession by J. Pierot (1831–40), J. H. Molkenboer (1840–46, partly with the assistance of C. Kerbert, co-author of his 'Catalogus Florae Leidensis', and of Schultes Jr.), and for nine years (1853–1862) by H. van Hall. It was also Blume who, in these years, started to publish a descriptive, commented catalogue of the Rijksherbarium collections in his work 'Museum Botanicum Lugduno-Batavum' (started in 1849).

Van Hall was appointed 'Conservator' instead of 'Assistant'. It was Van Hall who changed the paper (covers) of the collections and put carpologica in cardboard boxes. It is clear that at least two catalogues were in the making, one of indigenous plants, and another one for the general collection. In 1839 Blume stated that he wanted to give priority to the care of the collections over the promotion of large acquisitions; in that year he got Dfl. 700 for shelves and other necessary material, while the arrangement received more attention.

Under his reign it remained a constant worry that the salaries of the employees were too low when compared with those of the 'Rijksmuseum van Natuurlijke Historie'. Especially the assistants of the Conservator, mostly working students, were underpaid, with the result that the personnel was changing all the time. In 1856 Smeets was appointed and he continued to work under Miquel.

In *1850* another *Instruction*[18] was issued, containing some new features. It stated that in the case of duplicates of material, Dutch botanists and institutions had to be given priority. In this way e.g. the Military Academy at Breda was sent a collection of plants, as well as several other schools: a rather strange policy. Besides, it was

stated that the Director was obliged to give loans to botanists, in Blume's opinion, often to the detriment of the plant collections; this was in contradistinction to the Rijksmuseum of Natural History, where this was *not* done. This was an irritation to him, especially as the borrowed material was very often not returned within the stipulated time.

In this way the responsibility of the director was undermined and little could be done when Von Siebold took off to Japan again without returning his loans.

Probably the new Instruction had been instigated by complaints from Miquel, De Vriese, Von Siebold, and others who wanted to borrow material from Leiden, requests met only reluctantly by Blume.

According to the Instruction the work on the Catalogue had to proceed. Furthermore, it prescribed that *no unicates* were to be removed from the collection and only duplicates were to be used for exchange; this regulation was hardly one to which Blume would object. Finally, it was stipulated that the director had to refrain from publishing discoveries made by still living persons, unless with their consent. This latter regulation was probably induced by former accusations that Blume had made use of annotations, mostly extensive field-notes, made by collectors such as Kuhl and Van Hasselt, without acknowledging their names as his source. It should be commented, however, that it is common practice among taxonomists, up till the present day, to make use of any data or field notes made by collectors. The original value of a systematic revision can not be compared with that of field-notes, valuable and often indispensable in themselves as they may be.

Though Blume seemed tight-fisted when it came to making use of the collections under his care, in his reports he stressed the importance of work done on them as a means of coming into possession of authentic specimens with incalculable value for science. At the same time he realized that it was an impossibility to demand publications on loans within a specified time.

Blume was constantly on the barricades, defending his institute, stressing again and again that collections made by government officials with government money ought to come to Leiden. As already mentioned before, the foundation of the Herbarium Bogoriense was a thorn in his side, just as was the fact that great quantities of plants were given to private persons, often including specimens not present in the Rijksherbarium. He declared again and again that both Junghuhn's and Hasskarl's collections must be considered the legal property of the Rijksherbarium, that plant collections from the tropics must be forwarded regularly and that it was detrimental to let them accumulate for too long. It is ironic but true that his own attitude made people reluctant to have their collections under his care, especially so as he was certainly essentially right.

Although most collections denied to Blume later came to the Rijksherbarium, an exception is the one of Diepenhorst in Sibolga (N.W. Sumatra) and some others from that island, of which Teysmann forwarded only a duplicate set to Miquel, whose herbarium became the core of that at Utrecht. This material formed the basis of the 'Flora of Sumatra', in the Supplement of his 'Flora Indiae Batavae'.

One of the features of Blume's management were his efforts to interest pharmacists destined for the colonies in the tropical flora. They evidently had to work for some months in the Herbarium and Blume took great pains over their tutoring, hoping, as he said, to see one day the fruits of the seeds he sowed. In the end his attempts were unsuccessful, as from most of these nothing more was ever heard. He

had an idea that a similar compulsory stage in the Herbarium might also be useful for military surgeons, but to my knowledge this idea never came off.

On the other hand he had good relations with some pharmacists, such as Th. D. Vrijdag Zijnen who often visited the Herbarium, donated material and was the author of many publications. Also K. W. van Gorkom worked for some time on *Cinchona* of which Leiden had acquired considerable material, *viz.* dried plants from Peru, the *collection Weddell* (the basis of his book 'Histoire naturelle des Quinquinas', 1849), all specimens with original handwritten labels, thanks to a visit to Paris and personal contact with Weddell. Besides authentic bark specimens from Vrijdag Zijnen, v. Bergen and Poeppig are still partly at Leiden, but they are in a bad state through inadequate labelling.

In 1842, after a small acquisition of plants from Central America (Caracas), collected by Consul *J. G. van Lansberge*, Blume started a campaign, writing to several consuls abroad to interest them in making collections. He seems to have met with meagre success, but at least a small collection of orchids followed, made by *Van der Linden* in Central America.

In later years Blume had a plan to interest missionaries, for which he asked government support in vain. Meanwhile Miquel had already started a training course in the Mission-House at Utrecht with special emphasis on the collecting and storage of herbarium specimens. Later, the famous botanist Ferdinand von Mueller of Melbourne succeeded in acquiring many plants collected by missionaries in SE. New Guinea (Papua), even before English administration, and under very unfavourable conditions there. Why it was never a success in those years in Holland I cannot explain.

In the Blume period collections increased considerably. For the *Dutch East Indies* the more important ones are those of *Spanoghe* in Timor (basis of his 'Prodromus florae timorensis', 1841), *Korthals* (Borneo, etc., described in his 'Kruidkunde' etc.), *Forsten* (mainly Celebes, plants described by Blume and Miquel), other collections from the '*Natuurkundige Commissie*', and a large number of Java plants from Blume's friend, *F. A. C. Waitz*, a former colleague.

From the *West Indies* important acquisitions were: *R. Schomburgk* from British Guiana, Surinam plants from *J. Eyken Sluijters*, duplicates from *Herb. Molkenboer*, *Reinwardt* and *Miquel*, and the *Herb. Splitgerber* (about 1846 stored in the Hortus Academicus building).

From *Japan* the collection of *Von Siebold* is of the utmost importance (basis of Siebold & Zuccarini 'Flora Japonica'), followed by those of *H. Bürger* (Von Siebold's successor in Deshima), and *Textor* (purch. of 4450 specim.), on which Miquel based many new species.

It cannot be said that Blume did not try to establish relations with foreign botanists and herbaria. As hardly any correspondence of Blume is known to be extant, it is easy to underestimate his activities in that direction. The annual reports,[10] as far as they have become available, give a fairly good insight into the acquisitions of those years.

Several reports are still missing, but by piecing things together, an overall picture can be obtained. He carefully built up the collections under his care, trying especially to get authentic specimens.

An important *Sieber* set, containing filices, cryptogams, Agrostotheca, Cape plants, Flora Mauretania, Trinidad etc. is in the Rijksherbarium, where extensive

plant lists are in the old archives. It was almost certainly acquired (bought) in Blume's time, or even before that, as Sieber stopped collecting before 1830.

In 1846, thanks to Blume, the *Herb. Schultes*, consisting of 10,000 identified plant species, most of them the basis of Römer & Schultes' 'Systema vegetabilium' (1817 – 30), was acquired. This important acquisition contained plants from Europe, Mongolia (coll. Chesney), S. Africa (coll. Ecklon and Zeyher), Brazil (Martius), California, S. America (coll. by H. Cuming and his son-in-law, Bridges), Australia (coll. Sieber, Büning), and many German cryptogams. It contains isotypes and possibly even holotypes. It was the redemption of an old promise dating from the foundation of the Herbarium at Brussels. J. A. Schultes himself had died and the son was negotiating with the Russian government on the sale when he was reminded by Blume of his father's promise. In return Schultes Jr. was temporarily appointed to the Rijksherbarium, waiting to be sent out as a surgeon or naturalist to the Dutch colonies. Evidently he proved to be a very unstable person and was dismissed after some time.

In the Blume period three other important herbaria were acquired, viz. those of *Persoon* (Europe; many important types of fungi and duplicates of bryophytes) in exchange for an annuity of 500 Taler paid by the Dutch government from 1825 till his death (1836), and presented by King Willem II to the Rijksherbarium; the *original herbarium of Dozy & Molkenboer* (the basis of 'Musci frondosi inediti archipelagi indici' and other publications), the authentic specimens of which were regularly consulted by C. M. van der Sande Lacoste; thirdly the *Herb. Splitgerber* (mainly from Italy and Surinam). Of the purchase of the latter Blume only heard secondhand, as it was originally meant for use by the Academy. Its incorporation into the Rijksherbarium took until 1871. Two catalogues in book-form (1836 and 1842) belong to it. *Herb. Reinwardt* (incl. German plants from Herb. Reichenbach, Hoppe and Schultz) was also bequeathed to Leiden.

Duplicates were exchanged with Paris (including several authentic specimens of orchids acquired from SE. Asia, Bourbon and Madagascar, Senegal (coll. Leprieur), New Zealand and New Holland (= Australia)), Berlin (Brazil, ? Sellow dupl.), Geneva, Breslau (from Herb. Göppert and Henschel), Herb. Hooker, Herb. Lindley (orchids), Herb. A. von Bunge (China, Altai), Petersburg (= Leningrad, N. & W. Asia, Caucasus and Siberia), Christiania (Scandinavia), Prof. Kickx at Ghent, Stockholm (Sweden), N. American plants (through Asa Gray at Harvard, Cambridge, U.S.A.), Brussels (Mexico, Centr. America), Dr. Bueck at Hamburg (Ecklon and Drège plants from the Cape), Louvain (S. America), Galeotti (Mexican ferns), Wendland (American palms). Duplicates of the 'Plantae Preissianae' (Australia; coll. 1830 – 41), described by J. G. C. Lehmann at Hamburg, might have been acquired in this period. The author's collection and types are in Stockholm. Promises of duplicates were made by R. Brown and Presl.

Blume was much in favour of this exchange of duplicates, but often stressed the shortage of assistants who are certainly conditional for a responsible attendance to selection, sorting, and ticketing of duplicates for distribution.

Other collections were bought or presented, including 300 plants from Brazil (*coll. G.S. Barao de Campanema*), plants from Tripoli (*coll. Consul Jhr. Cliffordt Kocq van Breugel*), Egypt plants (from *N. Bové*, and *Dr. Husson*), from Italy (*coll. Mrs. Macpherson*), Central America (*coll. Van Lansberge and Van der Linden*), authentic American orchids from *Prof. Reichenbach*, and a purchase of 2,677 species and 1,201 indigenous plants from the '*Esslinger Reiseverein*'.

This society was established at Esslingen near Stuttgart, and employed collectors whose plant collections were to be divided under the subscribers. It flourished under E. G. Steudel and Ch. F. Hochstetter, and was handed over to R. F. Hohenacker in 1842. The latter had in mind to have plants collected in that part of India where Rheede's Hortus malabaricus had been illustrated. He did not succeed in finding somebody willing and able to collect in the vicinity of Cochin, but he succeeded in interesting F. Metz[22], missionary at Mangalore, and later in the Nilgiri Hills, both regions with a very different climate (and flora) from Cochin.

Wallich duplicates from India were presented by the English East India Company and Blume asked for a privileged position when plants were distributed, with a view to the importance of the specimens for Leiden.

New relations were made with Uppsala (Prof. Fries), Montpellier (Martins), Nancy (D. A. Godron), and G. Bentham in London. As regards Holland itself, relations with Prof. J. C. van Hall (father of the Leiden conservator) were good, and the latter presented plants to Leiden.

Visitors to the Rijksherbarium included H. F. Link (Berlin), E. Boissier (Geneva), E. Mayer (Carlsruhe), Colbach (Stuttgart), and Wendland (Hannover).

Plant collections were studied by R. B. van den Bosch (*Hymenophyllaceae*), Alph. DeCandolle (e.g. *Piper*), Decaisne, Reichenbach, J. C. van Hall, W. H. de Vriese (*Ficus*), Miquel (for his Flora Indiae Batavae), Von Siebold (Japanese collections),Molkenboer & Dozy and Van der Sande Lacoste (Bryologica javanica), J. Müller Arg. (*Euphorbiaceae*), and many others.

The reason that the Blume era has relatively been very extensively treated, is because of the fact that W. A. Goddijn, when writing his contributions to the centenary of the Rijksherbarium[11], did not have at his disposal the written reports of the early period. What I learned from those confirmed the opinion that Blume must be considered as the founder of the General Herbarium. Furthermore, it has become very clear that he worked very hard indeed to extend and enrich it and that he had to perform this task under adverse conditions, both with regard to housing and especially, lack of personnel.

c. Directorate of F. A. W. Miquel (1862–1871)

F. A. W. Miquel's appointment as Blume's successor came off in 1862. He retained his position as professor at the University of Utrecht (at that time still Hoogeschool). His work at Leiden was only part-time, which, in combination with the dismissal of H. van Hall as conservator (see p. 32), left only Smeets, a pharmacist, in permanent charge.

In his first annual report Miquel gave a short outline of the situation. There were three rooms available:

1. for the Herbarium proper, i.e. the arranged and identified collections,
2. for the provisional storage of material still to be identified and inserted (then 25,000 species) in the arranged collection, and
3. for the duplicates for distribution and exchange, mostly from the Dutch East Indies.

The latter had, before distribution, to be compared with specimens already inserted in the arranged collection. In how far this was done, and how expertly done, remains to be seen, as only Smeets will have been responsible for it.

It was done at such a rate that in 1863, 11,860 duplicates were ready for distribution and in about 1868 most of the available duplicates had been distri-

buted. It is not surprising that in this way much damage was done, e.g. original labels of Blume may be found in Paris, while they are missing here. In this way the Paris specimens are sometimes erroneously taken as holotypes, while these are in fact in Leiden. To make it worse, at that time the material was mostly not yet mounted on paper, but simply put in covers. Too much handling could therefore easily cause damage.

In 1862 the plants were stored in portfolios, viz. 600 with phanerogams, 200 small ones with cryptogams. Besides there were fruits and other material in spirit, and wood samples. The collection was *not* used for academic tuition.

In 1864 a list of the Filices in the Rijksherbarium was finished, mainly consisting of species of the herbaria of Junghuhn, Splitgerber, and Reinwardt.

Miquel was well aware that unnamed dried plants had no scientific value. To gain this they had to be revised by specialists who were invited by him to do this work. He himself planned to work up the remaining families. They were to be published in the 'Annales Musei Botanici Lugd.-Bat.' (1863 – 70). He made no attempts to make the Rijksherbarium a centre for systematic botany. The families were sent to the specialists, all too often at their homes, and without proper control of unmounted material. Among the co-operating botanists, partly suggested by DeCandolle, may be mentioned Mettenius for the ferns, Schott for the *Araceae*, Caspary for the *Nymphaeaceae*, Radlkofer for the *Sapindaceae*, Hooker for *Nepenthes*, and Andersen for *Gramineae*. Herbarium visitors were Baillon, Kanitz, a.o.

Contact with Kew was extended, newly made with Basel, Calcutta, Dorpat, Greifswald, Palermo, Vienna, Tübingen and Strassburg. The old relations from Blume's time were continued.

As to the collections, it was stated in 1866 that all were systematically arranged and new labels were attached to the bundles; in 1867 the Japanese collections were all identified and the catalogue was finished (Miquel 'Catalogus Musei Botanici Lugduno-Batavi. Pars prima. Flora japonica', 1870).

In 1868 he made three divisions in the Rijksherbarium, respectively for the Dutch East Indies, Japan, and a General Herbarium for his 'Annales'.

Van der Sande Lacoste was found willing to arrange the cryptogamic collections. He was an eminent bryologist whose work covered the tropics also, author of 'Synopsis Hepaticarum Javanicarum' and one of the authors of 'Bryologica Javanica'.

Miquel's generous policy with regard to the distribution of duplicates certainly had a good effect with regard to acquisitions in exchange.

From the *Dutch East Indies*, as was to be expected, hardly any collections were sent to Holland. It would take some years for friendly relations with Herbarium Bogoriense to bear fruit. *Herb. de Vriese* was bought (at least part of it; Hooker duplicates were considered government property. Badly labelled!), and probably in Miquel's time also several cryptogams and a series of *Zollinger 2nd stay in Java* with detailed labels (other Zollinger plants were acquired later with the Herb. Ned. Bot. Ver.). *Junghuhn*'s plants (revised by Miquel & de Vriese in 'Plantae Junghuhnianae') were incorporated too. A few small collections of cryptogams were sent by *Semmelink* (Flores), and *Von Rosenberg* (Celebes).

From the *West Indies* some duplicates were presented by *Prof. Meisner* (Basel) but the important acquisition was the *collection Kappler* from Surinam, evidently partly (or also) made with (by) F. W. R. Hostmann. It was acquired by the Government.[10]

The *H. H. Ch. Focke* duplicates from his 'Plantae Surinamenses & Guyanenses' (1835–50) possibly came to Leiden through Miquel, as the originals are at Utrecht. Dozy & Molkenboer inserted his Musci in their 'Prodomus florae bryologicae Surinamensis', both from Miquel's herbarium and from the 'Leidsche Hoogeschool' collections.

Very important plants enriched the collections from *Japan*, certainly thanks to Miquel's interest in that flora and his many publications on it. Asa Gray sent duplicates from *Perry's Expedition*, collected by J. Morrow, Williams, Small, and Wright. From Kew 1,200 duplicates from *Oldham's collection* were received, and from Petersburg *Maximowicz' duplicates* (author of 'Plantarum novarum Japoniae'). Besides most of Von Siebold's plants were returned (Miquel finished the last volume of the 'Flora Japonica').[21] A collection made by '*Ito Keiske*' was acquired too. When looking for possible information on this collector, I came to the conclusion that he must be the same as Keis(u)ké Ito,[12] one of the pupils of Von Siebold. It probably came into the possession of the Rijksherbarium together with the Von Siebold collections. According to H. Hara there are no herbarium specimens of his in Japan. Papers published by Ito can be found in Merrill and Walker[13]. Miquel used his name many times in epithets of newly described Japanese plant species as 'keiskei' and also named a genus Keiskea after him, probably being ignorant of the fact that Keis(u)ke was his Christian name, and Ito his family name. This herbarium is kept separate.

Among other acquisitions mention must be made of important cryptogams presented by *Buse* and *Van der Sande Lacoste* (authentics of 'Bryologia Javanica'). In later years, under Suringar, their total collections came to the Rijksherbarium.

For *Europe: Willkomm* duplicates from Spain, Lapland and Scandinavian plants acquired from Stockholm and Uppsala, *Herb. Kickxia belgica*; plants belonging to his 'Flora Siciliae' were sent by the author, *Prof. Agost. Todaro* at Palermo.

For *Africa*: coll. *Gust. Mann* from the Niger, *Keulemans* from Guinea (Ilha do Principe), *Pollen & Van Dam* 110 plants from Madagascar[14], *G. Schweinfurth* from the Sudan (base material for his 'Beitr. z. Fl. Aethiopiens'), *Burchell dupl.* from S. Africa (from Kew).

For *other regions* the following were important: *Kotschy* from Asia Minor (main set in Vienna), *Vieillard & Planche* (Deplanche) from New Caledonia and New Zealand, and Mexican plants from Bourgeau (1865–66, *Palliser's Expedition*), presented by Paris; S. and Central American duplicates from Berlin, Basel, and Geneva (also fragments of DeCandolle); *Burchell* Brazil duplicates from Kew. *F. von Mueller* contributed Australian plant duplicates. Asian plants from *Hooker & Thomson*, *Griffith*, *R. Wight*, and *Falconer*, totalling 3,200 specimens, were received from Kew too.

Another item to be mentioned must be the *Compositae* presented by the specialist *K. H. Schultz (named Bipont)*.

Important duplicate Algae collections were added, e.g. from *Prof. Agardh* at Lund, *Characeae* from *Prof. Braun*, presented by F. von Mueller and Berlin, and by G. von Martens made by *E. von Martens* on the 'Preussische Expedition' (1859–62). The latter collection is the basis of the only botanical volume published on that expedition.

Miquel's private herbarium with its many types went to Utrecht.

W. L. de Sturler presented wood samples from the Dutch East Indies, which certainly formed the basis of his 'Catalogue descriptif' (1867), and belonged to an exhibition in Paris (no longer at Leiden).

d. Directorate of W. F. R. Suringar (1871 – 98)

After Miquel's death Suringar, then professor of botany in Leiden, was asked to take over the supervision, again without pay. He realized that it would be necessary to expand the collections considerably, not only the phanerogams which were certainly not representative for the whole world, but more especially with a view to the cryptogams.[11] Duplicates for exchange were, after Miquel's policy, in very limited supply, and purchases would be inevitable. As funds were not always available, he often paid the expenses privately, which brought him into conflict with the Government, as the director was not allowed to have a private herbarium. The question was solved by Suringar in making it over partly as a legacy on his death, and for another part it was refunded by the Government, albeit with considerable loss to Suringar. It specially concerned the famous lichen type *Herbarium Körber* (basis of 'Lichenes selecti germaniae'), and *Herb. W. D. J. Koch*, used for the latter's Synopsis on the German and Swiss flora. Evidently Suringar had partly retained his Algae collection which was bought by Mrs. Weber-van Bosse on his death.

In 1871 the last parcels of plants, viz. of the *Herb. Splitgerber*, the *Herb. Reinwardt* and the latter's *Herb. variorum botanicorum* (including a large collection of Teysmann plants), were transferred from the Hortus Academicus Herbarium to the Rijksherbarium. The following year, 1872, the *Herb. Ned. Bot. Vereeniging*, incl. several cryptogams, came to the Rijksherbarium (see p. 30)[20]. The Herb. indigenum from *C. A. J. A. Oudemans* in Amsterdam, author of a Flora of the Netherlands, was bought.

Already in 1874 Suringar reported the many shortcomings and deficiencies of the building and the desirability of having the Herbarium, Hortus, and Botanical Laboratory close to each other. His being in charge of the three institutions may partly have influenced this wish. It was not until after Suringar's death that this idea materialized.

It was Suringar's conviction that, although the Rijksherbarium had been placed officially under the supervision of the Curators of the University in 1876, an independent position had to be guaranteed, with a library of its own and two 'conservators' (not until 1881 was J. G. Boerlage appointed). More than his predecessors he saw the Rijksherbarium as an institution for international scientific research, the first attempt to make it a centre for systematic botany. On the other hand he wanted to use it also for academic tuition, contrary to Miquel (whose pupils were at Utrecht!).

In 1875 it was stipulated that it was not allowed to give out on loan already described plants when no duplicates were in hand.

Chr. Luerssen from Leipsic continued the work on ferns started by Mettenius; H. Graf zu Solms Laubach worked on the *Pandanaceae*, and DeCandolle in Geneva borrowed material as he did in former years. Material of camphor trees was loaned to Dr. P. Maisonneuve in Paris. K. J. Maximowicz, the specialist on the Japanese flora worked for some months in the Rijksherbarium in 1875. Other visitors were Caruel (Pisa), and Haynall (Pesth).

The acquisitions under Suringar have been extensively cited by Goddijn[11], and only the more important ones will be selected here. Mention must be made of the *Herb. Buse* (35,000 spec.)[15], *Herb. Van der Sande Lacoste*, *Herb. Hasskarl* (c. 20,000, mainly European, and his own Java collection), and the legacy of *P. W. Korthals* (notes, diary, and fragments of S. American and D.E.I. plants). Unfortunately it is hardly possible to join the latter's loose notes to his plant specimens. Through Korthals' waning interest in botany and his turning to philosophy, the care for his collections was not what it should have been. Duplicates were provided with printed labels without mentioning exact localities. In this way a so-called Sumatra plant might have been collected in Java, and also Borneo and Sumatra material is sometimes wrongly labelled.

Though sparingly, collections from the *Dutch East Indies* came in, viz. *Boerlage* (coll. W. Java 1888), dupl. Herb. Bog. from Timor and Borneo made by *Teysmann*, *Koorders dupl.* and a bought Java collection made by *J. C. Ploem*. Of importance were those from adjacent regions: 2,000 *Vidal specimens* from the Philippines (pres. by the Spanish Government), and *Kew and Calcutta duplicates* from the British part of Borneo and Malacca (Malay Peninsula). The purchase of a very complete set of *H. O. Forbes* plants, made in Sumatra, Java, Timor and Southeast New Guinea is a milestone. Dutch interest in the 19th century in the immense island of New Guinea was minimal. A few collections had been made on its outskirts by *Zipelius* (with the 'Natuurkundige Commissie'), by Teysmann (not in Leiden), and a few government officials, but it remained incidental. Botanists must have been aware of its considerable interest from a botanical view, but the impulse for Dutch exploration in the western half of the island (taken into possession long ago) did not come until the 20th century.

Collections from the *West Indies* were supplemented by *Suringar* (collected himself, incl. Algae), *Korthals* (not collected by him), with *Herb. Buse*, *Herb. Reinwardt*, and with a bought set of Flora Indiae occidentalis and Flora Americae tropicae (*coll. H. Fr. A. Eggers*).

Japanese plants were presented by the *Vrijdag Zijnen* heirs and Petersburg.

As regards *Europe*, many plants were received from other herbaria, including from Austria, Hungary, Russia, Denmark, and Sweden (nearly complete), and *Focke* (*Rubus*).

New were *arctic plants* collected by *Botteman* (Greenland) and duplicates from Greenland and Spitsbergen (phanerogams and Musci) presented by Stockholm; Berlin dupl. coll. *Chr. G. Ehrenberg* (Abyssinia, Arabia, etc.), with many cryptogams; plants from Djeddah (coll. *Consul Kruijt*).

Important bought acquisitions were: those of *Balansa* made in Paraguay and Cochinchina (from his widow), *Ross Herb. siculum*, Algerian plants from *Battandier & Trabut* (authors of 'Flore analytique et synoptique de l'Algérie et de la Tunisie'), *Pierre* from Cochinchina ('Flore forestière'), *Cardoso* from the Cape Verde Islands, *Schweinfurth* from Egypt, *Callier* Flora Silesica.

The *Cinchona* collections from the Exhibition in Vienna were handed over to Leiden. Apart from eventual herbarium material, they are no longer here.

Cryptogamic acquisitons, other than those included in the herbaria of Buse and Van der Sande Lacoste, were numerous, including mosses sent by *Schimper*, the *coll. Brébisson* (Algae), the already mentioned *coll. Körber* (lichens), *Wittrock & Norstedt* (Algae), *Herb. critt. Italiano*, *Rabenhorst and Thümen exsicc. mycol. et lichen.*, *Rabenhorst Fungi Europaei*, *Flora exsicc. Austr. Hung.* (3,600), and *Herb. Baenitz.*

It appears that more than ever collections were bought. Evidently Suringar succeeded in convincing the government of this necessity. His policy should be admired; he was the author of a critical flora of the Netherlands, and papers on Algae.

Late in the 19th century large collections were presented to Wageningen for the use of future forest officers.

e. Directorate of J. M. Janse, J. P. Lotsy and J. W. C. Goethart (1897 – 1931)

The beginning year of this era in the history of the Rijksherbarium is not arbitrarily chosen: it is the year that J. W. C. Goethart was appointed Conservator and the start of his long career in this institute, – from 1910 as Director – up to 1932. Prof. J. M. Janse was officially in charge from 1899 – 1906, but he made it clear very soon that his interests were in a different field of botany. In 1906 he was succeeded by Dr. J. P. Lotsy, an eminent botanist but more interested in experimental taxonomy than in herbaria; as already mentioned (p. 31) he left Leiden in 1909. So after all it was the stamp of Goethart's personality which determined herbarium policy.

From the outset Goethart was unhappy with the making of a catalogue. Through the stricter application of the then emerging International Rules of Nomenclature, many names and epithets changed and still more names had to give way to others by the progress of taxonomical revisions. He found that it was unjustified to devote so much time to keeping the catalogue up to date and he decided to abandon its maintenance. During the first World War he initiated the cutting up of the Index Kewensis alphabetically within the families. In this Index all names were marked which are present in the general collection. This methodology is applied until the present day; it necessitates checking all names of newly received material and all new identifications (very time-consuming for the technical personnel), before inserting material. It may become a bottle-neck in making collections available. After all the general herbarium is in itself an alphabetical catalogue of the file, through which the virtue of the marking of names in Index Kewensis becomes dubious.

Technical care of the collections was Goethart's prime concern. Prof. Janse succeeded in attracting funds for this aim. The arranging (systematically as to families, alphabetically within these, and geographically for the species), after mounting all specimens (in 1908 1/6 of the collections were not yet mounted), and numbering of the, at that time, c. 1,500,000 counted specimens, was an immense job. Disinfection was intensified. Besides, the collections in liquid and the carpologica had to be attended to also. Extra space was needed and was temporarily provided in a private house and on the premises of Rapenburg 22. In 1912 the preliminary work was finished and the building in the Nonnensteeg was occupied as the new abode. It was a great improvement, but not ideally planned; space for the library had been forgotten, and legend has it that also a letter-box was omitted! The first item had to wait several years, the latter was more easily realized.

Goethart's second concern regarded the staff. He succeeded in attracting Hans (J. G.) Hallier, who worked in the Herbarium from 1909 – 22. Especially by his experience in the tropics, more specifically won during his stay at Bogor, and when accompanying the Nieuwenhuis Expedition to Borneo, this erudite scholar was a most valuable asset to the staff. After he left, research on the tropical flora fell dormant till 1933.

The appointment of Dr. W. J. Jongmans and the acquisition of botanical fossils

will be skipped here. Jongmans specialized in palaeobotany, and became an outstanding authority on the Carboniferous flora, in co-operation with the coal-mining authorities in the south of the Netherlands. In 1919 he accepted employment with the national Geological Survey centred at Heerlen; the fossil collections and the literature on palaeobotany were then also transferred to Heerlen. It may be worth mentioning that in 1910–11, for the first time, 30 extra reprints of his palaebotanical publications were ordered for use in exchange, a policy the library practises till the present day with regard to publications by staff members.

The acquisition of the collections of the *Mycological Society* (mostly material in spirit) (see p. 30), brought along the development of a mycological department (see Van Brummelen's paper in this volume). Conservator Van der Lek was in charge, soon succeeded by Cath. Cool (who from the outset had given all her energies to the collections, primarily without pay), and later by Lütjeharms (1929).

The authentics of *Rabenhorst* (over 5,000, Europe and extra-Europe), *Junghuhn*, *Zollinger*, *Von Thümen* ('Mycotheca universalis', 2,300), *Opiz*, *Kurz*, and others were rearranged.

European *Fungi* from *Jaap* (fasc. 1–34, nos 1–850) were added, and besides Fungi from *Roumegère* (from France, basis of 'Synops. Fl. Crypt.'), and *Sydow* (4,900, German and exotics; author of many publications) were bought; also *Saccardo* 'Mycotheca universali' (1,600) and *Ellis & Everhart* from N. America (3,600) were acquired. Various specialists made use of the better accessibility, such as Lloyd, J. H. Miller, and R. Heim.

Through a gaffe of Prof. Janse, who refused admittance to the Herbarium of the 'Botanische Vereniging' to Burck, this Herbarium was taken away from Leiden and transferred to Haarlem in 1912. It came back to Leiden in 1925.

More than ever before, families of plants were sent on loan for study and in this way type specimens in the Herbarium increased.

During World War I many activities came to a standstill. Acquisitions were few and it was an excellent opportunity to work through arrears which in most herbaria are an ever recurring situation.

In these thirty odd years the collections grew considerably. For the *Malesian* region the enormous amount of duplicates (2nd set) from *Herb. Bog.* leaps to the eye. The era of contestation was definitely past and the flow of material began. More activity in exploration of the natural treasures of the colonies (by the government and the Dutch Geographic Society) resulted in collections too, e.g. during *Van Daalen's Expedition* to Atjeh (coll. Pringgo Atmodjo) and by *J. W. R. Koch* in New Guinea (described by Valeton); several others followed, but mostly Bogor received the 1st set, Leiden the 2nd; a duplicate set of *Koorders* from Java was acquired. Thanks to E. D. Merrill's policy large sets of duplicates from the Philippines found their way to Leiden, augmented by the purchase of *Elmer* specimens. For Borneo *Hallier*'s collection, and for the Lesser Sunda Islands, that of the *Elbert Expedition* must be mentioned (plants at Frankfurt and Leiden); the results of both expeditions have been published by H. Hallier (types in Leiden).

Numerous *West Indian plants* were acquired, including *Boldingh duplicates* and the *coll. Curtiss*, the latter not represented in Utrecht. In general it is the latter Herbarium which has the important Surinam collections and type specimens.

For *Europe* the main acquisitions were: *Herb. Koch* (see p. 42), *Herb. Gravet*, and *Herb. D. Lako* (critical Herb. Indigenum).

For *Africa*: new additions from Tunesia (*Pitard*), and S. Africa (*Wilms*, *Miss*

Leendertsz, Goddijn & Lotsy originals, and a nearly complete collection of *Proteaceae*), 'Exsiccatae' from *Zenker* (Cameroons), and *Schlechter* (Austro-Africanae).

The *New Caledonia* and *Samoa* (*Herb. Baenitz*) collections were enriched, and those of *Central & S. America* with 'exsiccatae' from *Herb. Baenitz* (Chile), *Sintenis* (Portorico), *Heller* (Mexico and Portorico, California), *Fiebrig* (Paraguay), and last but not least with the 2nd set of *Ule* '*Plantae Bahiensis*' from Brazil (of utmost importance now as the Berlin master-set was destroyed during World War II). Bolivia plants from *Herzog* were partly revised by Hallier, and a set could be retained here.

As to special groups, large sets of *Kneucker's Carices* and *Gramineae* were bought.

The mycological department has been discussed above (p. 45), but the other cryptogamic collections increased also. Especially the Musci got many additions: *Fleischer* (Ind. Arch.), *Herzog* (Bolivia), *E. Bauer* (Europe), *Gravet* (Belgium, 3,000). Lack of funds was the reason that the collection Geheeb was lost to Leiden. To the lichens 'exsiccatae' from *Weg* and *Arnold* were added. The fern specialist Rosenstock revised the material from S. America.

In these three decades of the 20th century the growth of the Rijksherbarium was, for a great part, acquired by 'exsiccatae' (identified numbered collections), a tendency already apparent under Suringar. Professional collectors operate even in more recent times, but become, at least nowadays, rather scarce and they are mostly zoologically orientated. A life without our modern securities will attract only a few people. The more so as those who are interested in nature nowadays have more opportunity for a university education.

Many private herbaria still came on the market, while owners with private means could well afford to make donations.

f. Directorate of H. J. Lam, C. G. G. J. van Steenis, C. Kalkman (1933-hodie)

From 1933 on, to start with H. J. Lam, succeeded by C. G. G. J. van Steenis (1962 – 72) and C. Kalkman (1972-hodie), a considerable expansion took place. Notwithstanding the slump of the '30s, a selected staff of specialists grew, be it at first in modest positions with comparable pay.

As a professor of systematic botany, Lam tried to interest students in the tropical flora, up till then only done by Went and Pulle at Utrecht (Lam, Van Steenis and many others were educated there).

Lam himself had worked in the Dutch East Indies for many years, and had made expeditions to New Guinea and the Moluccas for Herbarium Bogoriense. Especially after 1950, with the incorporation of the Flora Malesiana staff, the appointment of more algologists, mycologists, and still later, specialists for the bryological collections and ferns, a morphologist, a wood anatomist, a palynologist, and a plantgeographer, it can be truly said that the Rijksherbarium became a full-grown modern institute with an adequate library and technical staff. Many Leiden theses resulted.

The favourable wind does, however, not blow forever and the present director, C. Kalkman has a difficult time to defend his budget. Vacancies are all too often not filled, with deplorable consequences.

Although a large part of the staff is working on the tropical (Malesian) flora, the Dutch flora has not been neglected by any means. In 1925 the Herbarium of the *Botanical Society* had returned to Leiden and was incorporated in the Dutch

collection of the Rijksherbarium in the '40s. Together they form a separate unit up to date. The exotics and cryptogams were inserted in the collections concerned.

In 1934 the Algae Herbarium (73,000 specimens) of the famous specialist *Mrs. Weber-van Bosse* was presented, including not only her own collections made along the Atlantic coast and during the cruise of the 'Siboga' in Malesian waters (4 vols of the Siboga Expedition are based on her material), but many others she had bought over the years.[17] In this way the collections *Hauck* '*Phycotheca universalis*' (fasc. 1–15, including most of his types), *Suringar*'s Algae collections (sold by his widow) with the renowned *Herb. Kützing* (the specimens often marked as 'authentics', now called types), in which several collectors are represented, and part of *Lenormand's herbarium*, all came to the Rijksherbarium. A number of 'Exsiccatae' collections were represented too. This acquisiton, the earlier Algae collections of the Rijksherbarium, and the appointment of Miss J. Th. Koster, initiated a department for the *Algae*, flourishing up to this day (see Prud'homme van Reine & Lokhorst's paper in this volume).

As to other cryptogamic collections, it may be mentioned that R. A. Maas Geesteranus during the war years started to build up a collection of dried Fungi (instead of in liquid), for which he developed the technique.

During World War II many activities came to a standstill but once more the staff (since 1934 joined by S. J. Van Ooststroom) had the opportunity to demolish the backlog, to overhaul the material in liquid, which was in a bad state and had partly to be thrown away, to be relabelled, etc. A catalogue was made of species in liquid and of carpologica. Besides it was thought necessary to evacuate the upper floor of the building, while type specimens as far as could be recovered were assembled and stored in the basement.[19] According to Lam the types numbered about 30,000 in 1945. One of the students (Mr. Sinia) prepared a list of the collections, alphabetically and geographically arranged.

After the war was over the traditional hospitality of the Rijksherbarium was kept up, and numerous botanists and amateur botanists worked with the collections, with benefit for both parties. A subsidiary effect is that privately owned collections of the now called 'honorary staff members' are in time mostly presented to the Rijksherbarium.

In conjunction with shortage of space, both at Utrecht and Leiden, and the consequence that new buildings would be needed, Lam developed during the war the idea of a fusion of all herbaria in the Netherlands into a large central herbarium, not necessarily situated in Leiden. In a special session of the concerned staffs at Utrecht in November 1947, under the authority of the Botanical Society, this idea was extensively discussed. The concept of establishing a separate Central Herbarium, independent of the universities, was rejected for several reasons. The agreement was perpetuated that Utrecht would focus its work and extension of collections on the New World and Leiden on the Old World. Later Wageningen came to specialize in the flora of Africa. This policy has proved successful.

The Rijksherbarium intensified and extended its connections with botanical institutes especially in the Old World. Air-traffic greatly facilitated these contacts. In later decennia several foreign taxonomists co-operated in the Flora Malesiana project; Leiden staff members reciprocated by participating in the Flora of Thailand and Ceylon projects, by collecting and publication.

Expeditions made by staff members in the Old World considerably enlarged the Rijksherbarium collections, and formed a new source of duplicates for exchange. In

the first place, however, it was the intention to fill in some gaps in the knowledge of certain under-collected areas of the Malesian and adjacent regions. From the former German part of New Guinea (Kaiser Wilhelmsland, the NE. part) practically nothing had been distributed by the Berlin centre, and during World War II all those collections (with many type specimens) were destroyed. Although these are irreplaceable, it is of importance to match new collections with the described species and make 'topotypes' as far as possible. Other important collections such as those of Warburg, the Sarasins, and Schlechter are nearly non-existent in Leiden, the latter two even in most herbaria.

Preliminary identifications of incoming collections were mostly performed by C. G. G. J. van Steenis and R. C. Bakhuizen van den Brink Jr., with considerable help from F. H. Hildebrand during several years for sterile material of trees from the Forest Services, for which he had expert knowledge from his long experience in the Forest Experiment Station at Bogor (Java) as assistant to F. H. Endert.

It is, in fact, the only way to make newly collected material available to specialists, and to safeguard them against casualties by distribution of duplicates, a policy employed by Merrill in the Philippines, which has proved so important for Philippine botany. Besides it encourages amateur collectors who are anxious to know the names of their plants.

In this span of over forty years, numerous collections found their way to Leiden and only the more important ones, *excluding* those made by staff members, will be mentioned here.

The Algae collection Weber-Van Bosse has already been recorded. Another collection of outstanding importance is the *Herb. Oudemans* (Fungi) which was in Groningen and is now on permanent loan to Leiden; it belongs to his 'Catalogue raisonnée', and came here at the instigation of Van Steenis through the intermediary of Prof. Chr. van den Hoek.

W. M. Docters van Leeuwen and his wife, *Mrs. J. Docters van Leeuwen-Reynvaan* presented their collections of European and tropical galls (dry and in liquid).

I will further only mention the names of *Agsteribbe* (bryophytes), *Henrard*, *Jansen & Wachter*, *Van Ooststroom*, *Van Soest*, *Kloos*, *De Leeuw*, *Kern & Reichgelt*, *Wagenaar Hummelinck* (Algae), *Groenhart* (lichens), *Donk* (Fungi), *De Joncheere* (Filices), *Broeksmit* (Myxomycetes), *Huijsman* (Fungi), *Boom* (mostly cultivated plants), to give a fractional idea of the important acquisitions. In addition several series of exsiccatae were bought.

Exchange of duplicates is going on all the time, though be it that some herbaria have more or less passed into oblivion, while others have come to the fore, such as Ann Arbor, the Arnold Arboretum (Brass and Kajewski specimens), Manila (Philippines), Washington U.S. Herbarium, Canberra and Lae (East New Guinea), Sandakan (N. Borneo, now Sabah), Kuching (Sarawak) and Brunei, Kepong and Kuala Lumpur (Malaysia), and from 1952 – 1962 the Forestry Herbarium at Hollandia and subsequently Manokwari (W. New Guinea).

Of course Bogor remained of paramount importance for duplicates, and since the old controversy, Blume versus Teysmann was forgotten, it was the rule that Leiden was provided with the first duplicate, although unicates were kept at Bogor. To speed up the shipment to Leiden, Wieringa, head of the technical department of the Rijksherbarium, was stationed for 6 years at Bogor in the 1950s.

For phanerogams I will mention the purchase of *Herb. D'Alleizette* (20,000, many from the French colonies), *Seidel* (Namibia), *Carr* New Guinea plants

(5,533), *Clemens* Br. N. Borneo (3,128) and New Guinea (1,000) plants. Besides acquisitions from Morocco (*P. A. W. J. & J. J. F. E. de Wilde*), Flores (*Father E. Schmutz*, 3, 842; *Father J. A. J. Verheyen*, 4,660), Thailand (*Kostermans* 2nd set 388 specimens, and *Bloembergen*, *>1,000)*. The already mentioned *Brass* and *Kajewski* plants from New Guinea and the Solomon Islands, D'Entrecasteaux Isl. and Louisiades of which good sets are here as the preliminary identifications were made at Leiden.

In 1959 an important collection (2,117 nos) was made by students in Turkey (mostly coll. by *Hennipman* and *W. J. J. O. de Wilde*), and bought by the Rijksherbarium.

Through Dr. Sleumer's work, after his retirement, on American tropical plant families, and thanks to his connections in South America, numerous duplicates found their way to the Leiden Herbarium, notably those collected by *O. Zöllner* in Central (and partly N.) Chile (1968–75), by *G. Hatschbach* from Parana (SE. Brazil; mostly identified by specialists; 1968 onwards), and by *Father Reitz* and *R. Klein* from Santa Catarina (SE. Brazil).

The new departments had to build up collections too.

Wood anatomy now possesses c. 14,000 samples, partly duplicates from sister-institutes (Utrecht, Kew, Oxford, Sandakan, Canberra, Flora of Malaya Series (Kepong)). Though staff members of the Rijksherbarium contributed to it, as did Malesian orientated institutes, the collection is of a cosmopolitan character.

As to old collections (of historical value only) I may mention here Japanese samples, painted with leaves, brought home by Von Siebold; in 1969 they were transferred from the Botanical Laboratory to the Rijksherbarium. Other old wood samples, presented in the 19th century, have gone missing or may have been presented to the Colonial Museum at Haarlem (now 'Tropenmuseum' in Amsterdam).

Microscopical preparations, anatomical and morphological slides, and palynological preparations all form part of the collections now.

Very useful for the identification of handwritings on old herbarium labels, in many cases important for the establishment of collector and the place of origin of the specimens, is a collection of facsimiles brought together by the efforts of Miss J. Th. Koster.

5. SURVEY OF THE PRESENT STATE

The collections amount to approximately 2,500,000 specimens from all over the world. For phanerogams it will hold true that there is a tendency for the flora of the Netherlands (and Europe), and the Malesian region to rank first as work is mostly done on those regions. For the cryptogams things are rather different. The collections are from all over the world also, but it is mostly monographic work on families or genera which is done here.

As regards the phanerogams, the families are arranged according to De la Torre & Harms, while genera, species and varieties are placed alphabetically within the families. In addition, they are regionally marked by coloured labels on the covers, viz. 10. Eurasia, 20. SE. Asia & Malesia, 30. Australasia & Pacific, 40. Africa, 50. N. America, 60. Central & S. America, 90 OH. Cultivated & unlocalized. This system has the advantage that all material of a certain taxon lies together. Within the

Malesian region (as defined by Flora Malesiana), all the covers of every species are arranged and geographically marked from west to east: Continental Asia, Malaya, Sumatra, Java, Borneo, Philippines, Celebes, Lesser Sunda Islands, Moluccas, New Guinea. In this way it is possible to get a quick insight into the geographical distribution.

On the sheets it is recorded whether a palynological sample has been made of that particular specimen, and whether a pertaining wood sample, carpologicum, or material in spirit, are present.

As regards synonymy, since about twenty-five years ago, name changes, following the progress of taxonomy, are kept up to date, transferring specimens if necessary and putting a blank reference sheet in place of the abandoned name.

The names are given according to Index Kewensis, and if later monographs exist according to those. The latter system is, however, not yet conscientiously followed; it would take up far too much of the staff's time while the main issue is the possiblity of finding a specimen either under the new or the old name.

Type specimens (holo-, iso-, etc.) are inserted in the collection (in Washington, New York, etc. they are separately kept). In principal they are marked as such, i.e. as far as occasionally found, and in each case in recently revised groups. A specific search to mark all types in this enormous collection would take up far too much time at the cost of creative work.

The only lists kept up to date are those of a number of large collections from Malesia, either of personal collections (e.g. L. J. Brass, C. E. Carr, etc.) and specified institutional series (Lae, Kepong, Kuching, etc.). An inventory of all such lists has been made by Van Steenis (1972)[16]; they have proved very useful.

As to the cryptogam collections, these are, for the greater part, alphabetically arranged. Genera and species delimitation is far less stabilized than with phanerogams, and in this way it is more practical. Jülich (the mycologist) started with a systematical sequence in part of the collection of Fungi, but stopped doing so. Mosses and liverworts are kept apart.

Disinfection was and is a problem through the years, although methods and facilities have improved.

The Rijksherbarium is not of the same scope as Kew, and although intended as a General Herbarium, every region of the globe is not equally well represented. As the work is mainly concentrated on specific regions, the main policy is to get those as complete as possible. It remains a pity that the collections of e.g. Horsfield, Warburg, and for the larger part, Teysmann, are not in the Rijksherbarium, but specimens are sent on loan all over the world, be it sometimes with the exception of type specimens.

Also Malayan, Indian and Indo-Chinese collections from the former century are sparingly represented, due to the fact that during the last quarter of the 19th century Leiden took no active part in Malesian botany. There is, however, a rather good representation of a set made by King's collector.

Expeditions by staff members will collect under one collecting number several duplicate specimens, and in this way provide exchange material. This exchange is executed in a rather liberal way, along the lines of Merrill who called this 'free exchange', that is, herbaria forward duplicates as far as these are available, without taking too much into account a precise counter-exchange. The chief aim is that they be deposited in centres where they will be useful for the progress of systematic botany.

Herbaria and forest institutes in Malaya, Borneo, New Guinea, and Indonesia, when sending numbered duplicate specimens, will have their collections provisionally named by which they benefit.

Series of exsiccatae are made at Leiden too, at the present a series of Zeeland (SW. Netherlands) Algae.

As already said elsewhere, visits of foreign botanists are fruitful for identification of provisionally named specimens, and for personal contact.

To judge the importance of Leiden collections, we have to think only of the Fungi of Persoon, the Algae of Weber-van Bosse, Ule plants from Brazil, and the numerous Malesian authentic collections which taxonomic botanists cannot do without.

Retrospect. When I look back at this attempt at writing the history of the collections, I cannot help feeling that outsiders might easily say: Well, another instance of Parkinson's Law. The growth of the Rijksherbarium over the last 150 years has been enormous, not only as to the materials, but also with respect to its staff. The scope of the work done has been greatly enlarged. But fortunately Parkinson's Law does apply mostly to bureaucracy and not to scientific work.

The knowledge of our planet, and more specifically nature, forms the basis for judging the human possibilities. The plant world is an essential part for the survival of man and all related sciences such as genetics, physiology, organic chemistry, phytochemistry etc. will have to work with identified plants, ensuring that the effort to understand nature in this way does not remain in a void.

6. SOURCES

(1) cf. M. J. van Steenis-Kruseman. 1962. Blumea 11: 505–508.
(2) cf. J. P. Lotsy. 1907. 'Catalogus Gesch. Tentoonst. v. Nat. en Geneesk. Leiden 1907' p. 24–30.
(3) cf. H. Veendorp & L. G. M. Baas Becking. 1938. 'Hortus Acad. Lugd. 1587–1937' p. 131.
(4) cf. S. J. van Ooststroom. 1942. 'Gedenkboek Valckenier Suringar' p. 208–217, 1 pl.
(5) cf. ditto in 1937. Blumea Suppl. 1: 193–209, 2 fig.
(6) cf. ditto in 1941. Ned. Kruidk. Arch. 51: 252–274, 3 pl.
(7) cf. H. Hallier. 1918. Rec. Trav. Bot. Néerl. 15: 27–122.
cf. Fr. Stafleu. 1969. Act. Bot. Neerl. 18: 216–223.
(8) cf. Van Ooststroom. 1939. Rec. Trav. Bot. Néerl. 36: 526–534, 1 pl.
(9) cf. typed list by Van Ooststroom in Rijksherbarium: 'Oude schatten in het Rijksherbarium' (Old treasures etc.).
(10) Although several old handwritten director's reports of the Rijksherbarium, extant in the Rijksarchief in The Hague, are now in the Herbarium Library (xerox copies), thanks to the diligence of A. den Ouden), several years are still missing, viz. those of 1829–35, 1838, 1841, 1843–45, 1847–49, 1851–52, 1876–95, 1900–02, 1918–26, 1928–29, 1932–33.
(11) cf. 1931. Meded. Rijksherb. Leiden nos. 62a–62b: 46 pp.
(12) More information on this collector can be found in C. A. Backer's Verklarend Woordenboek (1936) under Itoa Hemsl.
(13) In 1938. 'A Bibliography of Eastern Asiatic Botany' 1: 210–211.
(14) Fr. H. Pollen and D. C. van Dam, Dutch zoologist-explorers in Madagascar from March 1878-Jan. 1880. The zoological results were published by H. Schlegel and Pollen.
(15) cf. 1937. Ann. Bryol. 10: 157.
(16) cf. C. G. G. J. van Steenis. 1972. 'Reaping the harvest. Retrieval of names and identifications by means of Identification and Collection lists of Malesian plants.' Fl. Mal. Bull. 26: 2020–2037.
(17) cf. J. Th. Koster. 1936. Blumea 2: 229–234; 1948. Dodonaea 15: 54–68; 1969. Taxon 18: 549–559.
(18) cf. 1851. Flora N.R. 9: 109–112.
(19) cf. 1945. Blumea 5: 426–436.

(20) cf. W. H. Wachter. 1945. Ned. Kruidk. Arch. 55: 12–116, several photogr. It is an elaborate survey of the weal and woe of the society and its herbarium, library, periodicals, etc.
(21) An Index of Japanese plant names by Von Siebold is in the Library of the Rijksherbarium. The Latin equivalents are added.
(22) cf. R. F. Hohenacker. 1849. Flora 32: 556–560. List of exsiccatae some names validated in footnotes.
Hohenacker asked F. A. W. Miquel to name the Metz plants. Several are worked up in his Analecta botanica indica.
(23) The housing of museum collections at Leiden have had a chequered history, often difficult to trace. Mr. Leverland of the Municipal Archives (Gemeente Archief) told me that the concerned building (purchased by the Government in 1829) housed the 'Kabinet voor Pleisterbeelden' and the 'Prentenkabinet' from 1835–1865, besides a 'Physisch Kabinet' and 'Landbouwhuishoudkundige Instrumenten' up to 1850.
(24) cf. S. Rauschert. 1970. Hercynia 7: 301–324.
(25) cf. A. Lourteig. 1966. Taxon 15: 23–33.
(26) cf. C. G. G. J. van Steenis in the present jubilee volume, p. 60.

INDEX

This index serves to enable checking which collections are mentioned in this chapter and what is their main geographical provenance. To facilitate consultation three subdivisions are made: 1. Names of owners of private herbaria (incl. societies), distributors of 'exsiccata' series, expeditions, and collectors; 2. Geographical provenance; 3. Plant groups, families or genera, being part of the collections.

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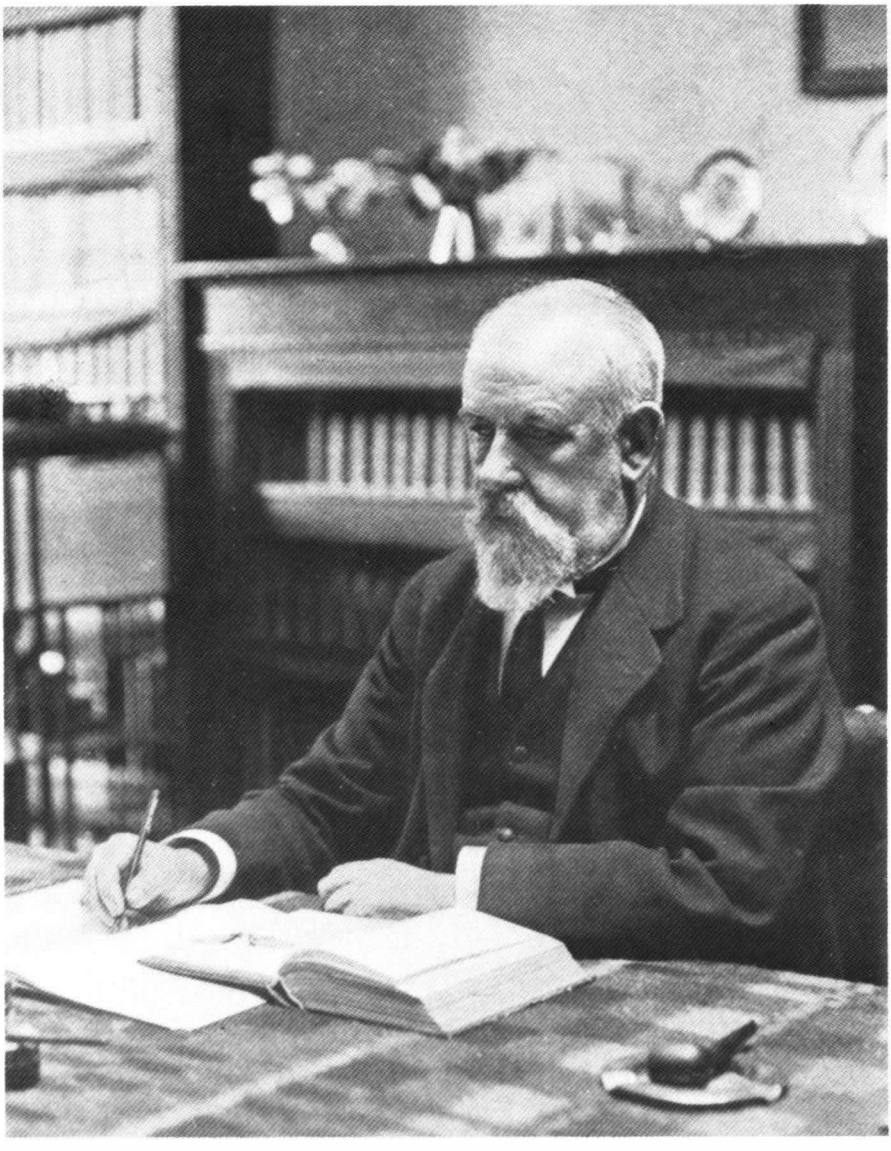

J. P. Lotsy (1867 – 1931)
Director 1906 – 1909
Reproduced from Genetica 13 (1931)

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THE RIJKSHERBARIUM AND ITS CONTRIBUTION TO THE KNOWLEDGE OF THE TROPICAL ASIATIC FLORA

C. G. G. J. VAN STEENIS
Rijksherbarium, Leiden

The role played by the Rijksherbarium in the progress of Asian botany is of course closely interwoven with the history of exploration and phytography, and its evaluation needs, therefore, a background setting in the development of scientific botany in the East.

The Rijksherbarium was founded after a decade in which, for the second time, the knowledge of the Malesian flora made a big jump forward, this time on a large scale, and on a professional level, by many persons, in a definite and successful way.

The first attempt to expose its botanical treasures was in pre-Linnean times by the outstanding amateur naturalist, Rumphius, who lived from 1653 – 1702 on the island of Amboyna in the Moluccas. His voluminous MSS on the botany of the Moluccas and other islands were published posthumously through the sponsorship of J. Burman in 'Herbarium Amboinense' (6 vols, 1741 – 1750, 7th 1755). In this standard work he described more than 1300 plant forms, many of which were illustrated.

Linnaeus got this work too late to evaluate it in his 'Species Plantarum' (1753). Through this (strange) mischance its scientific contribution did not come to be fully appreciated and it was for a very long period neglected.

The main sources of Linnaeus' knowledge of Asian plants stemmed from continental SE. Asia, viz. those which he had earlier published in his 'Flora Zeylanica' (1747) which were largely based on the Hermann collection made in Ceylon (1672 – 1679) and the 'Hortus Malabaricus' by Van Rheede tot Draakestein (12 vols, 1678 – 1703), apart from occasional odd records from collections or descriptions by Breyne, Osbeck, Kaempfer, etc.

1753 – 1817

The 'Flora Indica' (1768) by N. L. Burman, professor at Amsterdam, was a bad and haphazard compilation which did not add clarification to the fragmentary picture of Malesian botany.

Neither did Lamarck's 'Encyclopédie méthodique' (13 vols, 1783 – 1817) and his 'Tableau Encyclopédique' (4 vols, 1791 – 1823), which incorporated the Malesian collections by early French explorers (Commerson, 1768, Sonnerat, 1771 – 1772, De la Billardière, 1792 – 1794).

Botanical exploration in the last quarter of the 18th century in Java had been extremely promising, but its outcome met with singular misfortune through quite unrelated mishappenings.

The first was by Solander who assisted Banks during Cook's first voyage. He

collected in West Java in 1770 for three months, resulting in a MS, 'Plantae Javanensis' in which he described 338 species. Due to Banks' notorious aversion to publishing, this MS was shelved till the present day in the British Museum. His collections were available to Gaertner for his famous book on seeds and fruits (1788 – 1792).

In 1775 and 1777 Thunberg made a fairly large collection in coastal West Java, but it was not methodically documented until a mere name list appeared in his 'Florula Javanica' (1825).

In 1783 – 1784 the Swede Hornstedt made a fair collection in the coastal districts of North Java, the results of which remained unpublished until 1949.

A major effort was made in 1786 when Fernando de Noroña explored the interior of West Java gaining the first botanical glimpses of the Javanese mountain flora. Unfortunately his collection was lost and he died soon afterwards in Mauritius (1788), his large MSS and plates at Paris giving testimony to his singular zeal and talent.

A still greater, prolonged exploration of Java was made by the Frenchman, Louis Deschamps, who travelled all over the island (1793 – 1798). Unfortunately his collections were lost too, his plates and diary (no MS) being the only fragments of his work to be left to posterity.

Leschenault de la Tour collected during a French expedition in Timor (1801, 1803) and East Java (1803 – 1806). His large collections were stored in Paris without being recorded in a tangible publication; his Timor collections were much later integrated into Decaisne's 'Herbarii Timorensis Descriptio' (1834).

One of the largest collections made (and preserved) in Java was that by Horsfield (1802 – 1818). It was only written up much later, and then only in small part, by Bennett & Brown, in their much delayed 'Plantae Javanicae Rariores' (1838 – 1852).

It is a singular coincidence of Fate that all the major efforts of this period had such poor results in terms of their publication.

In addition it should be emphasized that around 1820 the major part of the Malesian provinces were almost entirely unexplored, viz. Borneo, the Philippines, Celebes and New Guinea. Herbarium collections were almost absent, even from the Moluccas on which Rumphius had composed his Herbarium Amboinense.

This stood in sharp contrast to the successful progress in India where the able members of the Society of Botanists, 'The United Brothers' (Koenig, Heyne, Klein, Rottler, Roxburgh) and later Buchanan Hamilton and Wallich put Indian botany on its feet, in which the foundation of the Botanic Garden at Calcutta was a cornerstone (1791). In 1800 another important botanic garden was founded in Penang I. Indian botany would retain its superiority over that in Malesia all through the 19th century with the able and productive successors, Wight, Griffith, Jenkins, Hooker, Thomson, Clarke, Kurz, ruling the waves of Asiatic botany. They had the good fortune to receive the backing of the Hookerian centre at Kew, the joint effort finally culminating in the standard work, 'Flora of British India' (1872 – 1897), which incorporated also the flora of Malaya.

British botanists also filled other parts of the Malesian vacuum by sending out, from Calcutta, collectors to Malesia, e.g. Chr. Smith, whose collections from the Moluccas, Sumatra and Malaya were incorporated in Roxburgh's works, 'Hortus Bengalensis' (1814), 'Flora Indica' (2 vols, 1820, 1824) and its Carey edition (3 vols, 1832). British collecting in Sumatra, then a British colony, included that by Miller

(1770–1772), Campbell (1800), Marsden (1770–1776), Roxburgh Jr. (1802–1804), and especially that by Jack (1818–1822) whose precious work, 'Descriptions of Malayan Plants', covered both Malaya and Sumatra.

1817–1827

The brief sketch given above illustrates the fragmentary knowledge of the Malesian flora at the time when Reinwardt was in 1817 commissioned within a big scheme to explore the natural conditions of the Dutch East Indies in the fields of botany, zoology, geology, etc. He was charged to explore the resources of the country for agriculture, forestry, horticulture, etc. This resulted, in the same year, in the founding of the Botanic Garden at Buitenzorg (Bogor). His botanical staff was small, consisting merely of the garden curators Hooper and Kent, the latter in 1823 replaced by Zip(p)elius, and the draughtsmen A. J. and J. Th. Bik. Apart from them two young, eager, professional botanists were charged with botanical exploration, Kuhl and Van Hasselt; they were members of the 'Natuurkundige Commissie' (Natural Science Commission) installed in 1820 for scientific research; they had also a draughtsman, Keultjes, and a taxidermist/draughtsman, Van Raalten.

Reinwardt himself made a large exploration trip through the eastern parts of Malesia; Kuhl and Van Hasselt eagerly explored West Java. Unfortunately they soon fell victim to tropical disease, Kuhl and Keultjes after nine months, and Van Hasselt two years later. Reinwardt repatriated in 1822.

In 1822, his adjunct, Blume, medical doctor and Inspector of Vaccine, became Director of the Garden and took charge of the assembled materials, adding to them himself by exploring West and Central Java. In a fantastically short time he mastered the situation, published the first Catalogue of the Garden (1823) and set himself to the publication of the 'Bijdragen (Contributions) tot de Flora van Nederlandsch Indië' (1825–1826) in which he described over 1100 new species with brief Latin descriptions and many new genera, viz. 150, of which 84 are still in use while several dozen others are still used as infrageneric taxa. The species were arranged by families, each of which was accompanied by a commentary in appendices on their use. The 'Bijdragen' were continued in his 'Enumeratio plantarum Javae' (1827–1828, printed in Leiden), containing treatment of additional families, among them the Pteridophyta. The two works together, though fully centred on Java, laid a firm basis for further studies in other parts of Malesia. They were based on his own collections from West and Central Java, those of Reinwardt from Java and his tour in East Malesia (at least in part), and odd collections by garden personnel, amongst them Zip(p)elius in West Java.

He had no access to the collections of Kuhl and Van Hasselt, who were members of the 'Natuurkundige Commissie' and whose material was sent to the Museum of Natural History at Leiden. Their herbarium came only at Blume's disposal in 1828 except for part of it which had been entrusted to J. G. S. van Breda, professor of natural history at Ghent. Except for 57 plants this consisted of the *Orchidaceae* and *Asclepiadaceae* which Van Breda had agreed to study or at least prepare for the press on the basis of the preliminary descriptions of Kuhl and Van Hasselt as a posthumous honour. Of this sumptuous folio work 'Genera et species Orchidearum et Asclepiadearum quas in itinere per insulam Java ... collegerunt Dr. H. Kuhl et Dr. J. C. van Hasselt, editionem et descriptiones curavit J. G. S. van Breda' three parts appeared, each with 5 plates (1828–1829); it was discontinued because of the outbreak of the war and Van Breda's sudden escape to Leiden. Obviously he took

the herbarium with him, as this was transferred to the Rijksherbarium in 1844. In how far he succeeded in saving other plates and MSS is not clarified; in Bibliotheca Bogoriensis there is a book filed containing the detailed analyses of Kuhl and Van Hasselt on *Asclepiadaceae* and *Orchidaceae*. This could possibly contain the drawings of 181 plant species sent in 1825 by G. van Raalten to the Minister of General Affairs of which, on advice of Reinwardt, those of the *Orchidaceae* and *Asclepiadaceae* were entrusted to Van Breda for his work (Dr. P. Smit, in litt.).

Blume has later been accused of having harvested honour at the expense of his prematurely deceased colleagues Kuhl, Van Hasselt, Zipelius, and of Reinwardt, whose collections were all at Blume's disposal for his works; unjustly it appears to me. He fully acknowledged his debt to them in the title pages of his works in which he made use of their material. In fact the Kuhl & Van Hasselt sheets carry excellent field notes and flower analyses made in the field, but there are no indications that Kuhl in the 8 months, and Van Hasselt in the c. 3 years of their field work, went much beyond this preliminary stage. Whatever his other merits, Reinwardt was a poor systematist, as appears from his short 'Sylloge Plantarum'.

Taking into consideration his isolated position, the paucity of literature available to him, and the overwhelming abundance of unknown plant forms surrounding him, Blume proved himself a brilliant systematist, equal to the best of the 19th century; a man also who had the vision to frame the harvest later into solid works, to which his early works were clearly precursors. The reason for the explosive publication of the precursors is not quite certain, but the pending deterioration of the economy of the colony was a major reason for it. Another reason may have been the uncertainty of the times in the colony, many people dying young and shipments of MSS and material often being lost by shipwreck, as happened to many of Reinwardt's dispatches; competition with the British botanists in India may have been another incentive. Blume left Java in 1826, and after his departure the Government let the Bogor garden almost fall into decay. The large set of duplicates Blume meticulously left at the Garden were carelessly stored in an attic of the Palace, where they were later plundered by a German surgeon, Kollmann.

1829—1862

With the founding of the Rijksherbarium in 1829, which was very soon transferred from Brussels to Leiden, Blume, as its first director, could develop his master plan of composing a sumptuous folio work publishing in detail the flora of Java, in 'Flora Javae'. His single assistant was a young zoologist, Fischer (1804 – 1832), helping in the redaction of 'Flora Javae'.

The contributions of the Rijksherbarium to the flora of Malesia became Blume's one-man-show. Initially publication of 'Flora Javae' ran smoothly: in rapid succession treatments appeared of several families among which some interesting or large ones included *Rafflesiaceae*, *Fagaceae*, *Magnoliaceae*, *Annonaceae*, *Dipterocarpaceae*, and certain ferns (1828 – 1830), but publication was then abruptly stopped. A few years later it gave way to another work in the same sumptuous format and scale, 'Rumphia', which covered the botany of the whole of Malesia. Blume must have had more MSS and plates of 'Flora Javae' in portfolio, as others were published in 1847 (Pteridophyta), 1851 (*Loranthaceae*), and 1858 (*Orchidaceae*).

The publication of 'Rumphia' of which 4 volumes appeared (1836 – 1849), and which was of the same high quality as 'Flora Javae', was also discontinued for reasons unknown to me.

Blume must by this stage have realized that his ambition of producing a 'Flora of the Netherlands Indies' could not be realized within this scope. He set himself therefore the seemingly more modest task of an inventarisation of the complete Rijksherbarium collections, in accordance with one of the directives contained in the official instructions. These collections were, since 1829, enriched with the gatherings of the members of the 'Natuurkundige Commissie', Korthals (Sumatra, Borneo, Java), Spanoghe (Timor), Forsten (N. Celebes, Moluccas). In addition Blume had exchanged specimens on a small scale and by his contacts with numerous foreign botanists obtained material from Berlin, Geneva, Paris, Petersburg, etc., and from Asa Gray, Bunge, Lindley, Wallich, etc. He particularly wanted 'authentics', what we would now call isotypes. Besides, he had over the years tried to stimulate Dutch officials abroad, pharmacists, physicians and consuls living outside the country, to add to the collections.

The new work emerging was 'Museum Botanicum Lugduno-Batavum' (2 vols, 1849–1857). The purpose of it was to enumerate in a concise critical way, the Leiden collection, more or less arranged by families. In the 1st volume 972 species were treated, in the 2nd, 608. Some new genera and many new species were described; occasionally a complete census was made of a group beyond the Rijksherbarium collections. Why the work was so untimely discontinued is again unclear. Possibly Blume was at that time too heavily engaged in bringing out his most important treatment of the *Orchidaceae* of Java in 'Flora Javae' nova series, vol. 1, also published with a preface translated into French as 'Collection des Orchidées les plus remarquables de l'Archipel Indien et du Japon' (1858–1859).

Blume's contributions to the progress of Asian tropical botany were brilliant, but restricted. Though we do not know details, Blume must have been aware that in the forty years of his directorship, with few other duties to divert his attention, and obviously little correspondence, he had only accomplished unfinished works. One of the reasons for this was that he had cultivated from the beginning a monopolistic habit, by claiming that all important or original private collections should be deposited in the Rijksherbarium. Though one can sympathize with this standpoint seen from his position, one must be aware that at that period very many collections were private; the period of centralisation in a few big centres had hardly started. He should have considered that monopolizing would mean intruding on privacy, hence irritation, and could only succeed well by counterbalancing claims through liberal exchange, sympathetic help and collaboration in other people's efforts. In this he failed by reserving all Malesian collections for his own research. In the early thirties he lost the sympathy of Reinwardt, but other than this little harm was done, as he had no competitors.

However this soon changed and several works were published on Malesian plants by others, e.g. Blanco, 'Flora de Filipinas' (1837, ed. 2, 1845), Spanoghe, 'Prodromus Florae Timorensis' (1841), Korthals, 'Kruidkunde' (1840–1844), and later De Vriese, 'Plantae Indiae Batavae Orientalis ... exploravit Reinwardt' (1856–1857). Also many large collections were made to which he had no access, e.g. those by Von Siebold and his collaborators, Bürger, Textor and others in Japan (1823–1830), Junghuhn in Java & Sumatra (1835–1848), Cuming in the Philippines and Malaya (1836–1840), Hasskarl in Java (1837–1845), Zollinger in Java (1845), while Reinwardt also had a large private herbarium. Blume also tried to monopolize the collections made by Teysmann, the curator of the Bogor Botanical Garden since 1830, but (in a letter of Dec. 1844) the latter convinced the Govern-

ment that this was undesirable. The estrangement led Teysmann to collaborate with Miquel. For the same reason Blume managed to be on non- or ill-speaking terms with the botanists mentioned above, especially with Junghuhn.

This was a great pity, and a drawback for the promotion of botanical research, especially with respect to Korthals. This excellent botanist had been a member of the 'Natuurkundige Commissie' from 1830 – 1837 in the Netherlands Indies and was one of the happy few who had returned to Holland in safety, with his very large and ample collections made in Java, Sumatra and S.E. Borneo. He continued his work for the 'Commissie' by writing up the results until his pension in 1843. Between 1837 – 1839 he wrote a number of meticulous revisions on various groups, but they were for unknown reasons only published much later (1846 – 1854). He was then also engaged in his magnificent work, 'Kruidkunde' (1840 – 1844), which was of equal standing with Blume's works. He paid great attention to microscopical features in taxonomic research, as initiated by R. Brown and followed by Griffith. His excellent work had the promise of a successful career in botany. However, even while he was composing these works, he withdrew his interest in botanical study, as appears from an unpublished diary of Zollinger in 1841. He became absorbed in philosophical considerations, preferring, as De Wit puts it, 'serene, impersonal reflection to the strife and disagreements clouding relations among the Dutch botanists of his day.' Working in the same institute as Blume probably contributed to his growing aversion to botanical science. Apparently Blume did nothing to gain his sympathy and collaboration and maybe felt him to be a rival. It is much to be deplored that he spent the rest of his life remote from the science he had furthered so considerably; in 1892 he died, 84 years old.

Another aspect of Blume's policy which irritated many fellow-botanists, and stemmed from his monopolistic view of the Malesian material in the Rijksherbarium, was the fact that he refused to lend material to colleagues and to distribute duplicate specimens, unless for his own needs or profit. On the strength of complaints, the Premier Thorbecke officially ordered new regulations for the Rijksherbarium in 1850, opening its treasures to scientific botanists, which Blume grudgingly and incompletely submitted to.

Though it is true that, according to his annual reports, Blume had ample correspondence and personal contacts with many foreign botanists, these contacts were probably mostly intended to seek information and obtain material, rather than to gain scientific collaboration.

The splendid isolation from Dutch botanical circles in which he surrounded himself and the Rijksherbarium, created a vacuum which was filled by the creative attempts of others, notably by Miquel, then professor at Amsterdam. Miquel published, in collaboration with others, 'Plantae Junghuhnianae' (1851 – 1856), soon followed by his 'Flora Indiae Batavae' (1855 – 1859), a four-volume, more or less critical, comprehensive enumeration of all species found in, recorded from, or expected to occur in the Malesian area which he more or less delimited as we do today. From general sources, Miquel, who never set foot in the tropics, managed to compose a short introduction to the plant-geography and vegetation. Though in critical style the work could not compete with contemporary Floras of tropical Asia by British botanists, his work meant a landmark in the progress of Malesian botany.

1862 – 1871

After Blume died (1862), he was replaced as director by Miquel in the same year. Though Miquel remained professor at Utrecht (since 1859), then connected with Leiden by one of the first railways in Holland, and hence could not spend all his time with the management of the Rijksherbarium, he inaugurated for it a new explosive, open, internationally cooperative era in its function as the focus of Malesian and Japanese botany.

After composing the 5th volume of his Flora, the 'Supplement' (1860 – 1861), a rather uncritical 'Flora of Sumatra', he set about a more thorough treatment of Indo-Malesian plants in his monumental folio work, 'Annales Musei Botanici Lugduno-Batavi' (4 vols, 1863 – 1870). It also incorporated the important 'Prolusio Florae Japonicae'; in addition he completed the 2nd volume of Siebold & Zuccarini's 'Flora Japonica' (1870) at the request of Von Siebold's widow. It is almost unbelievable that he is responsible for most of the text of the 'Annales'; only for a few groups, Algae, Conifers, Pteridophytes, and a few groups of flowering plants he called on a dozen specialists in Holland and abroad for their collaboration. These he could easily find as Miquel was a congenial person who had the sympathy of the whole botanical world. He had very many ties then, or he renewed them, with fellow-botanists abroad, amongst them, Kew, the Calcutta Botanic Gardens, F. von Mueller at Melbourne, and with Teysmann at Bogor. With the latter it became a rule that a duplicate of all Bogor collections was sent to Leiden, a custom prevailing until the present day. All private herbaria mentioned above which had been refused to Blume were now incorporated in the Rijksherbarium, either obtained by gift or purchase. Liberal exchange of duplicates was organized on a large scale. Thus he succeeded in his period of directorship, 1862 – 1871, in restoring the name and fame of the Rijksherbarium, and through his fantastic activity, in making a fundamental contribution to the progress of the floras of Malesia, Asia and Japan.

1871 – 1933

Miquel's rather untimely death in 1871 meant a serious setback, especially as the former Leiden professors, Reinwardt and De Vriese, both of whom had had great interest in the flora of the East, had died before him, in 1854 and 1862 respectively, without leaving promising pupils in taxonomy. He himself had managed only two such pupils at Utrecht. Actually he complained that he could not attract more graduate students, which he ascribed to their lack of interest in pure science. A major factor in this may have been his desperate devotion to his own research to which he gave priority, and it is his feverish scientific activity which led to his amazing productivity. Stafleu mentioned that Miquel seldom prepared his lectures, and that he worked until a few minutes before the appointed hour, to resume his writing again immediately after.

His two 'taxonomic' pupils at Utrecht were De Boer who wrote a thesis on Malesian conifers and became professor at Groningen University, and the only real, all-round taxonomist, Scheffer, who sailed to Java in November 1867, to take up the directorship of the Botanic Gardens at Bogor.

To overcome the lack of a prominent, suitable Dutch taxonomist as a successor to Miquel, it would have been realistic to attempt to attract one from abroad. But lack of interest by the authorities and lack of support from scientific circles resulted in the adding of the task to that of the professor of general botany, Suringar.

Miquel had continued the 'Annales' under a new title, 'Illustrations de la Flore de

l'Archipel Indien', of which two fascicles had appeared. Suringar published his MS of the third fascicle (1871), but otherwise he did not stimulate or work himself on Indo-Malesian botany.

This was the beginning of an era of six decades during which the Rijksherbarium was a mere museum, a period of reception rather than emission. Suringar's own interest was the Algae, floristic botany of the Netherlands, and specific delimitation in *Melocactus*. He was not interested in 'big botany' and did not feel inclined to launch or to participate in large taxonomic projects such as were being undertaken in the leading centres of taxonomy, in Berlin, Kew, Paris and Geneva.

This provincial outlook on the function of a large herbarium for taxonomy was perpetuated when, after his death in 1898, the directorship was held by the professor of plant physiology, Janse, during the directorship of Lotsy (1906 – 1909), and that of Goethart (1910 – 1932). All of them regarded the Herbarium as a mere depot of specimens, a museum, not a tool, a working collection to disentangle the riches of the plant kingdom, especially that of the tropics. Lotsy's interest was mainly focussed on evolution and origin of species through hybridisation and Goethart shared the latter's interest and launched (with Jongmans) a project on the cartography of the Netherlands flora. Among the staff were two exceptions, notably Boerlage (see below) and Hallier f.

Hans Hallier was the son of the German professor E. Hallier. He had received an excellent education by some famous tutors and acquired a great knowledge of anatomical and vegetative characters. He had joined, as botanist, a large expedition to West Borneo (1893 – 1894) and was there confronted with an exceptionally rich tropical flora, completely different from the European one with which he was acquainted. The challenge to master this and sort it out heralded his lifelong interest in taxonomic affinity at the higher levels, which meant phylogeny. Following the expedition he was appointed in the Bogor Herbarium from 1893 to 1895 to participate in the 'Flore de Buitenzorg' project and to compose the volume on the flowering plants. For this purpose he collected in West Java, but the attempt never went beyond the making of MS lists of species which should be entered. A difficulty thereby was that the area to be covered by this Flora was never precisely defined other than by the vague notion that it went from coastal Priok to the summits of Mts Salak and Gedeh. To judge from his publications he spent this period more on working on his Borneo collections which, of course, were scientifically of far more interest than the well-known ones of the 'Flore de Buitenzorg'. For reasons unknown he left Bogor to accept a post at Hamburg, returning once to the Malesian scene during a world trip in 1903 – 1904 when he collected in the Philippines and Micronesia.

By his coming to Leiden in 1908, as a scientific assistant, the Rijksherbarium gained a prime taxonomist with great vision and knowledge, and an unparalleled form-knowledge, not only of Old World families and genera. His ideals were to frame a new phylogenetic plant system. For this purpose he dug into all sorts of families and genera to trace their affinities, reviving amongst methodologies, e.g., Greshoff's ideas, developed at Bogor, on the use of phytochemistry for taxonomical use: chemotaxonomy. His phylogenetical conclusions often differed from those of the Engler centre at Berlin, which sometimes led to acid controversy. His uncanny insight has often later proved to be correct, and not uncommonly anticipated opinions which are nowadays currently accepted. However, he frequently changed or recalled opinions on the speculative structure of the 'genealogical tree', while his

papers are often very difficult to consult. This frequently frustrated general recognition of his work at the time. At Leiden he rather worked in isolation as a 'Privatgelehrter'. His main works, on the elaboration of the large Elbert collections of Java and the Lesser Sunda Is., and Winkler's and his own in Borneo, are extremely important for the botany of Asia and Malesia, as they were interspersed by partial revisions and the straightening out of affinities and identification of many neglected generic concepts. As a person he seems to have been rather difficult and to possess fanatical idiosyncrasies; he refused, for example, permanent appointment and had no pension rights when he left in 1922. He then pursued linguistic studies, on the phylogeny of languages and derivation and change of words, a hobby earlier acquired by comparing vernacular names of Indonesian plants.

Although the period 1871–1933 was, apart from Hallier's and Boerlage's contributions to Malesian taxonomy, not a fertile one by way of contributions to research, it should be mentioned that in this period there were important acquisitions to the collections, amongst others from the Philippines and Malaya, and the herbaria of Hasskarl, Reinwardt, Forbes, Elbert, Hallier f., etc. It should also be mentioned that the availability of the specimens became established. Until 1909 they were shelved in largely unmounted condition in portfolios and many collections were kept separate. They were unified in one file and arranged alphabetically in the families especially thanks to Goethart who must take large merit for this ordering and administration, setting down the rules (rather perfectionistic) for herbarium techniques which prevail to the present day. Goethart also established a medium for publication, the 'Mededeelingen van 's Rijks Herbarium' (n. 1–70, 1910–1933), of importance for Asian botany as it contains most of Hallier's works. The growth and ordering of the Rijksherbarium during the period had made it, as Merrill emphasized in 1931, from his experience: 'an outstandingly important collection of historical botanical material' and apart from this he claimed that 'no botanical institution of the world contains such a mass of Malaysian material as that preserved at Leyden'. This is still true.

During the 19th century progress in Malesian botany by contributions of the Rijksherbarium hinged on lamentably few taxonomists, properly only on those by Blume, Korthals and Miquel. The only Dutch botanist who could have changed the picture and perpetuated Miquel's work was Scheffer, who went to Bogor in 1867 as Director of the Gardens and died early (1880). His few taxonomical publications were promising and gave testimony of his capacity in this field.

Shortly before, Beccari had launched a most important work, 'Malesia' (3 vols, 1877–1890) which, however inconsistently, more or less attempted to cover the Malesian flora; he revised several families in this work. How incompletely known the flora was at that time is illustrated by his treatment of *Icacinaceae*, of which he had 14 genera and 36 species, against Sleumer in 1971 with 23 genera and 101 species; and of *Dichapetalum* of which he had 3 species, against 15 given by Leenhouts in 1957.

After Treub succeeded Scheffer as Director of the Botanical Garden at Bogor in 1880, Burck was attracted to the work of revising some 'useful' families, but he did not go beyond *Dipterocarpaceae* and *Sapotaceae*. Treub was fully aware of the still primitive state of exploration and knowledge of the Malesian flora. The perspective of a 2nd edition of 'Flora Indiae Batavae' he deemed premature and out of the question. Therefore, he was very cautious in launching projects. To start with an important one, he could engage in the first place Boerlage who had been a custodian

of the Rijksherbarium since 1881 and who had made an exploration visit to Java in 1888. Boerlage agreed to compile a sort of precursor which took shape in his 'Handleiding' (3 vols, 1890 – 1900, incomplete) which he wrote at Leiden. It is an important, more or less critical 'Genera Plantarum Malayensium', largely adapted from Bentham & Hooker's 'Genera Plantarum'. It was intended as a tool enabling people in the Dutch East Indies to familiarize themselves with plant forms. Though lured to stay at Leiden by an assistant-directorship of the Rijksherbarium and a lectorate, Boerlage yielded to Treub's plea to rehabilitate plant taxonomy at Bogor, which had been dormant since the small efforts by Scheffer and Burck.

The departure of Boerlage, the eminent and only taxonomist of the Rijksherbarium, in 1896, to Bogor, meant a heavy loss to Leiden. More unfortunately, Boerlage, in search of 'Rumphian' plants in the Moluccas, met there an untimely death, in 1900, through tropical illness.

In passing, I should mention here a frustrated effort towards a 'Flora Malesiana' launched by Warburg, who had made, during 1885 – 1889, huge collections in Malesia. In Berlin, he had in addition many other Malesian herbaria at his disposal, e.g. those made by Riedel, Meyer and the Sarasins in Celebes, Meyen, Jagor and Haenke in the Philippines, Beccari and Forbes in various parts of Malesia, and material of the Kaiser Wilhelmsland expeditions. He started a great folio work, 'Monsunia', of which only one volume appeared in 1900, containing Cryptogams and Gymnosperms. The work was not a proper 'Flora', but an enumeration of records and descriptions of new species, without keys and without a definite, circumscribed area, with records from Korea, Japan, China, etc.

Meanwhile, by Treub's initiative, the torch of creative taxonomy of the Malesian flora was, after a lapse of some 70 years, switched back from Leiden to Bogor, a rapidly built up, thriving centre which regained its place as the centre of scientific botany of the colony. The escalated activity at Bogor led to the resumption or establishment of new media for publication, the 'Annales', 'Mededeelingen', 'Bulletin', 'Icones Bogorienses', while two fairly large but restricted taxonomic projects were undertaken, a 'Flore de Buitenzorg' and the 'Bijdragen tot de kennis der Boomsoorten van Java'. Besides Boerlage, some capable botanists were engaged (Valeton, Smith and Backer, the latter two self-made). Exploration was encouraged, provisionally only in Java, but also in Central Sumatra and North Celebes by Koorders, later extended through the forestry service to other islands.

During these years the ties between the Bogor activity and the Rijksherbarium were almost non-existent, apart from the sending of duplicate specimens to Leiden. A most important enterprise, evaluating the results of several New Guinea expeditions, embodied in the work 'Nova Guinea', was entrusted to Pulle at Utrecht, not to Hallier of the Rijksherbarium in Leiden. Pulle also revived tropical taxonomy in Holland and trained students in this field.

In the early twenties Herbarium Bogoriense, urged by the Forestry Department and Heyne's 'Museum for Economic Products', started the production of a series of family monographs, 'Contributions à l'étude de la Flore des Indes Néerlandaises' (no. 1 – 34, 1923 – 1937), and its staff was for this purpose fortified by a team of young taxonomists (Lam, Van Slooten, Danser, later myself) mostly educated by Pulle in Utrecht. Aware of insufficient exploration, this series had no pretensions beyond its being precursory to a comprehensive Flora, in a similar way that the 'Materials' of King & Gamble had been for Malaya; hence the cautious title of the series.

1933-hodie

With the appointment of Lam to Leiden, in 1933, as director, the Rijksherbarium resumed creative taxonomical research of the Malesian and Asian floras. By lecturing on taxonomy he activated students to participate in research on Malesian plants, thus giving a proper goal to his 'tropical section', small as it was. He replaced the 'Mededeelingen' with the journal 'Blumea' which was soon to become an indispensable medium for publication in Malesian botany. He promoted also collaboration with Bogor and published important revisions of Danser in Groningen, who had also activated students in the study of the Malesian flora. Thus, in the early thirties, progress in Malesian botany looked hopeful.

However, the world slump soon cast its shadows over this perspective. Especially the Bogor centre suffered severely, whereby its creative output necessarily fell to a low ebb: from 1935 – 1940 its staff for flowering plants consisted only of myself and Van Slooten. Lam and Danser also could not increase their staff.

In spite of these conditions, the idea of a 'Flora Malesiana' as the main goal, to integrate all previous efforts since Blume's time, lingered in these circles.

I started preparations for it in earnest about 1929. Two immediate tools seemed necessary anyway, viz. (i) a complete bibliographic file arranged by families, and (ii) a complete inventory of existing collections in the world's herbaria. Furthermore, I had to familiarize myself with the flora and plant-geography of Malesia in order to find a natural, scientific basis for the geographical delimitation of the project (1948). Finally I had to solve a most important practical point: the style and design of the Flora (1954). The aspects to cover in a scientific compromise were: critical taxonomy, comprehensiveness, source for ecology, plant uses, vernacular names, etc. to be a useful, botanical, cyclopedic tool for academic users in all fields of applied botany. Conciseness was most desirable in view of the size, estimated at some 25,000 species of flowering plants.

On the other hand completeness in evaluation of all names used in the past would be a conditio sine qua non, as such a large regional Flora would only be produced once. Expediency demanded that family revisions should be published when they became available, a procedure already in use in the 'Flore de Madagascar', and nowadays adopted in all large tropical Floras. As a matter of fact, in such Floras a 'system' has no proper function. As to size, family revisions would range from one to several hundred pages; it was therefore preferable to have them bound in volumes; a cumulative index in each volume giving access to all previous revisions. Some general chapters would provide information for users as well as collaborators, viz. on matters of variability, vegetation, plant-geography, dates of publication, literature, while the first volume would contain a comprehensive account of collections, collectors and their itineraries. This was the final compromise which has proved satisfactory till the present day.

Such a large, critical regional Flora would also have two international aspects. In the first place it would be of great importance for the botany of neighbouring countries, especially continental Southeast Asia with which it has much in common. Secondly, it would be of importance for 'big taxonomy' as it would, in certain families, represent a major part of the whole family, e.g. in *Dipterocarpaceae*, *Nepenthes*, etc. This facet had become increasingly important by virtue of the incompleteness of the 'Genera Plantarum' in the delayed 2nd edition of the 'Pflanzenfamilien'. For certain families, a reconsideration of their basic taxonomy

was, and still is, sometimes necessary, e.g. in *Loranthaceae*, *Sapotaceae*, *Sapindaceae*, *Dipterocarpaceae*, *etc.*

It was a blessing that in 1940, with the great rehabilitation of the Bogor Botanical Gardens through the Leiden professor, Baas Becking, the project 'Flora Malesiana' was approved by the Government. The idea was that, in view of its magnitude, it should be composed under international collaboration (1947), but emanate from Bogor with the close cooperation of Danser in Groningen as editor, and Lam of the Rijksherbarium in Leiden.

The international collaboration appeared especially essential in view of the fact that in the original plan 'Flora Malesiana' was divided into five series: I. Spermatophytes, II. Pteridophytes, III. Bryophytes, IV. Fungi and Lichenes, V. Algae. Discussions with mycologists and algologists soon made it clear that these series could not be well executed. Later this appeared also undesirable for the Bryophytes. For the Pteridophytes, however, it did appear to be feasible, and this series II is slowly blossoming under the editorship of Prof. R. E. Holttum (Kew), who is up till the present also its chief author.

World War II prevented its immediate realisation and unfortunately the collaboration of the eminent Danser came to nothing through his untimely death in 1943. But the postwar Dutch East Indian Government remained loyal to the prewar agreement and permitted me to start publication and visit herbaria in Australia, Europe and America to seek their support. In 1950 the Indonesian Government loyally lumped together all financial and administrative matter for the production of the Flora in a 'Foundation Flora Malesiana' (21 Oct. 1950, Bogor).

The task came to rest on three pillars, viz. (i) Herbarium Bogoriense, (ii) Flora Malesiana Foundation staff together with that of the Rijksherbarium at Leiden, (iii) foreign contributors. Together this would ensure a sufficiently large circle of international collaborators.

By contract with the Foundation the publishers would provide 300 copies out of the 1000 printed ones, at cost price and intended for official use only to Bibliotheca Bogoriensis at Bogor, thus ensuring availability to future generations of scientists in Indonesia.

Because of the excentric situation of Bogor, far from the big standard herbaria and libraries of Europe, it was clear that the redaction should be centred in Leiden, where the guest-team enjoyed the facilities of the Rijksherbarium under the benign eye of Lam.

During the war years Lam had himself undertaken a large botanical project, the publication and finishing by his staff of the MS, 'Flora of Java', Backer's life work. In view of the war risks this was initially published in Dutch in a mimeographed emergency issue of 25 copies. A later translation into English and a nomenclatural overhaul by Backer's main collaborator, Bakhuizen van den Brink Jr, made the printed English edition (3 vols, 1963 – 1968) a most important critical contribution to Asian botany by the Rijksherbarium. In fact it is the most accurate, complete and nomenclaturally up-to-date tropical island flora of similar size of the century, only recently equalled by Adam's 'Flora of Jamaica'. It contains descriptions of over 2000 genera and some 6100 species, among which over 4000 are native to Java. A flaw is that it does not account for all names recorded or described from Java in the synonymy.

It is true that such local tropical Floras are in a way premature; they should follow and be based on a regional Flora as I have earlier advocated (1949). From the

standpoint of 'big systematics' they are inefficient and a waste of time. In Malesia there was no regional Flora, and it should also be admitted that a good local Flora is useful and encouraging to local people. However, but for the presence of Backer's MS, I do not believe that Lam would have initiated a Flora of Java.

Another enterprise of Lam was the contribution of his staff members to the journal 'Nova Guinea' which was issued in octavo format in postwar times (1955–1966).

To return to Foundation Flora Malesiana, the team at Leiden, consisting of four botanists, an artist and a typist worked in marvellous harmony in producing the first volumes.

The Foundation Flora Malesiana team at Leiden was, of course, very important for the Rijksherbarium and formed a substantial complement to its tropical section, attracting collections and collaborators, extending the ties which it already had abroad.

As the Rijksherbarium, since 1879, had been given an official association with the University of Leiden, there was also an increase in the number of post-graduate students and promovendi attracted by the project 'Flora Malesiana'.

Unfortunately after seven years, its existence was threatened, with the abrupt cessation of funding on Dec. 31st, 1957, due to political difficulties. All attempts to approach large world foundations proved futile. However, fortunately, in Oct. 1958, a settlement was made, through the intermediary of the Netherlands Organization for the Advancement of Pure Research (Z.W.O.) by which the University of Leiden could adopt, in three years, the whole Flora Malesiana team, which could then go on with its task as official staff of the Rijksherbarium, the situation as it is today. Lam had eagerly promoted the merging, whereby his tropical section was considerably enlarged and gained a most responsible, clearly defined purpose which would occupy it for many years to come, possibly more years than he had anticipated.

In 1961, when the merging of staff of the Foundation Flora Malesiana with that of the tropical section had been completed, the section consisted of Bakhuizen van den Brink, Ding Hou, Jacobs, Kalkman, Kern, Leenhouts, van Royen and Sleumer. Afterwards others filled new posts or vacancies: van Balgooy, van Beusekom, Geesink, van der Meijden, Nooteboom, Veldkamp, Vink, de Vogel, and de Wilde. Hoogland had belonged to the staff of Flora Malesiana till 1952 and de Wit till 1953. Furthermore, there were some honorary collaborators of Flora Malesiana, supported by small grants: Backer, Jansen, Monod de Froideville, or working in a honorary position: van Slooten. There were also a fair number of temporary collaborators, often students or promovendi: Bentvelzen, van Borssum Waalkes, Caspers, den Hartog, van der Linden, Moeliono, Payens, Stemmerik, and Tuyn. Finally, Flora Malesiana enjoyed the collaboration of foreign contributors which appears from the pages of the Flora; the recent increase in their number is gratifying and most welcome.

The intensified work on Flora Malesiana led the Rijksherbarium to instigate important expeditions to under-explored areas of Malesia, notably New Guinea and its mountain flora. Also it has proved very remunerative for monographers to collect for themselves, to give them in situ field knowledge about their groups and a deepened insight into variability and ecology.

These collections are rapidly pre-identified and duplicates dispersed, from which other herbaria also gain profit.

Many other collections made in Malesia are sent to the Rijksherbarium by forest services, universities, pharmaceutical colleges, and by private explorers engaged in palynological, cytological, ethnographical and linguistical studies, attracted as they are by the prospect of having their collections pre-identified, at least to genus and, as far as possible, to species within a reasonable time. This service enriched the collections in no mean degree.

The definite home of Foundation Flora Malesiana having been established at Leiden enriched the Rijksherbarium also with some important publication media, Besides 'Flora Malesiana' itself, with 'Flora Malesiana Bulletin' (no. 1 – 31, 1947-hodie), 'Identification Lists of Malesian Specimens' (no. 1 – 56, 1958-hodie), and the 'Miscellaneous Records' (no. 1 – 4, 1959-hodie), while 'Pacific Plant Areas' (vols 1 – 3, 1963-hodie) also belong in this category.

The annual 'Bulletin' is an extensive newsletter on personalia, work in progress or planned, publication dates, conservation, and a full bibliography on taxonomical and plant-geographical work in the whole of Indo-Australia and the Pacific. Through the full indexes it has become an indispensable medium for information.

'Identification Lists' are a supplement to the revisions in Flora Malesiana and expose the identity of the material on which they were based.

'Miscellaneous Records' are a few mimeographed issues, preliminary to later publications and are intended for internal use.

'Pacific Plant Areas' was instigated, following suggestions by Lam, as a publication serving to illustrate plant-geography of the Pacific Is, including Malesia, by providing complete, accurate range maps, and informative text to each of these. The volumes also contain a bibliography to all published maps of Pacific and Malesian plant taxa.

In addition to these media the Rijksherbarium has recently started to continue the Supplements of Blumea as a separate serial, 'Leiden Botanical Series', intended for monographs which are too voluminous for Blumea. The series was inaugurated by a revision of the Old World species of *Symplocos* (1975), of great importance for Asian botany.

The precursory papers which, in part, belong to the revised families and (in greater part) to other studies of Malesian genera by staff members and collaborators (c. 750 in the period 1947 – 1977) are of great use to the progress of Asian botany, because frequently revisions involve the study of extra-Malesian species, mostly Asian & Pacific, in a few cases Australian plant species. Annually reprints are freely distributed to institutes in the Indo-Australian part of the Old World.

This great activity in research and publication by the Rijksherbarium on Flora Malesiana has of course a great impact on the botany, pure and applied, of the bordering areas of Asia and even Australia. In the regional Floras of Indochina, 'Flore du Cambodge, du Laos et du Vietnam' and the 'Flora of Thailand', and the local 'Flora of Ceylon' and 'Tree Flora of Malaya', abundant use is made of Flora Malesiana. For some groups, staff members of the Rijksherbarium were asked to collaborate for their speciality. Especially for the Flora of Thailand, staff members have been deeply involved in exploration, in collaboration with the Forest Herbarium of Bangkok.

We feel happy that in and around the Malesian area there is such a warm and close collaboration between botanists and their institutions, both pure and applied. It is a well-ploughed field promising rich harvest for years to come.

Though the Rijksherbarium is far away from the actual area under study, it is

proud to have taken a prominent part for one and a half centuries, in the preparation and execution of the common, international effort of botanical exploration and publication.

I am not infrequently asked three questions about Flora Malesiana, viz. (i) how many species are estimated to occur in it, (ii) to what extent will it be complete when finished, and (iii) when will the project approximately be finished. It may be of interest to make some estimates from my experience.

(i) The estimate should, of course, refer to the number of species after revision, not to the number of taxa actually described or recorded in the past. The experience has been that the work largely consists of reduction through integration, not so much of describing novelties. This reduction varies with the families, ranging from 20 to 60%. There is always a sprinkling of new genera and new species. This is also very variable, as some families have had great attention in the past, while others remained almost untouched for a century. A few examples may illustrate the point: *Ericaceae* now count 737 species among which 236 were newly proposed; in *Fagaceae* these numbers were 171 and 54; in *Loranthaceae*, 171 and 43; in *Cyperaceae* 327 and 24; in *Symplocos* 57 and 15; in *Bignoniaceae* 31 and 2; in *Leea* 25 and 1; and *Utricularia* 22 and 1. This variation defeats the possibility of attaining a standard measure of reduction and cannot lead to a reasonable estimate.

There is, however, another statistical method to reach a tangible estimate. It has appeared that there is in large regional floras, and for that matter, also in the world's flora, a ratio between the number of genera and that of species of Angiosperms, usually assumed to be an average of some 8 species per genus, for example in 'Flora Europaea'. This is approximately true for the five published volumes of Flora Malesiana: 477 genera and 3530 species, average c. $7^1/_2$. For the medium and large families which mostly contain also the largest genera it came to c. 1:10. Whereas the families still to be revised are generally large the average will probably be nearer to 10 than to 8. As the total number of genera is about 2300, the total number of species will be c. 23,000, which is close to my estimate of 30 years ago of 25,000.

(ii) From the 'Addenda et Emendanda' at the end of each volume it has already appeared that we cannot cherish the hope that Flora Malesiana will be complete. This holds true, of course, for all Floras; even to that of the Netherlands a few records of native species were added in recent years. What concerns us here is a matter of proportion.

The tropical rainforest offers in this respect singular features requiring intensive exploration. The enormously complicated flora of these endless forests, coupled with the fact that many indigenous plants have an unusually low population density and seem to be sometimes extremely scarce, makes completeness out of the question, notwithstanding the c. $1^1/_2$ million collections which have already been made. Almost every year some unknown or new genus is recorded which was not represented in earlier collections. The same is even more the case for species. So, exploration must go on by all means; especial desiderata are in Celebes and in the Moluccas.

However, on the whole the experience has been that the bulk of the species are present in the herbaria.

In this respect it is fortunate that Flora Malesiana started rather late in comparison with other regional Floras, such as those of Brazil, continental S.E. Asia, tropical and South Africa, and Australia. For this reason Flora Malesiana will be probably more complete.

Before finishing my comment on this second question, one thing must be stated, especially for the information of taxonomists in the northern temperate and subtropical regions: this is, the impossibility of making a tropical Flora as complete and detailed as Floras of their own countries. In the first place collections will be less in number because of the complex structure of the tropical vegetation, its huge amount of species, and the height of its many trees and lianas, requiring the help of tree-climbers, or else the cutting down of large trees; and, furthermore, the often difficult accessibility of the terrain requiring equipment for large expeditions.

Secondly, the absence of seasons in the rain-forest makes the collecting largely a matter of chance encounter. Taxonomists in the field, in search for certain species of the family they are working on, especially when hoping to study the variability of populations, should be well aware of this difficulty. The more so when taking into consideration the usually very low population density of most species in the tropical rain-forest, as correctly stressed by Fedorov.

It is agreed that hunting for special groups will help specialists to observe their plants in the living state, but the bulk of their species, especially trees and lianas, will perforce have to be studied in the Herbarium.

Even when tropical Floras are worked out and composed in tropical centres – which is in my opinion for many technical reasons not advisable – the above-mentioned difficulties remain.

Tropical botanical gardens may help along the study of tropical plants if they are well stocked with indigenous species, far more so than botanical gardens in temperate regions.

Whereas temperate species are mostly abundantly represented in herbaria, many tropical species are poorly represented, apart from weeds and plants from secondary vegetation.

Tropical collections are often incomplete in so far as they are but seldom with both flowers and fruit, and besides mostly with insufficient herbarium specimens to cover the complete geographical distribution of a species. Especially the sterile specimens form a problem: a considerable percentage of the forest specimens are collected during forest surveys. In the latter case forest services often made collections of all trees, irrespective whether they were in flower or fruit or sterile.

Botanical collectors should be aware that the times of the 'grab as grab can'-collecting are over. They should only take specimens in mature state, either in flower or in fruit, preferably in both, which certainly will require extra efforts in dioecious plants. Besides, collecting activities should be lifted to a higher scientific plane by giving careful attention to the making of ample field notes, as I have argued some years ago (1977).

The scarcity of complete material and of ample field notes will hamper the work of the plant taxonomist who deals with tropical genera; he can but do his best. The result is that the use of a tropical regional Flora often falls short of expectation when trying to identify incoming specimens. Without sufficient fertile material this is an impossibility. There is admittedly no essential difference between elaborating a tropical Flora or one of the temperate or subtropical regions, but just the same the composition of a tropical research Flora is of a different magnitude encountering more handicaps.

A serious handicap in composing tropical Floras, not encountered in the elaboration of northern temperate Floras, is the absence of reliable literature and precursory studies published by predecessors, as a sort of basis to start with. For

Flora Malesiana this basis is largely absent. Almost all revisions have to start from scratch in digesting a chaotic literature, the synthesis of which frequently concerns the delimitation of genera, and sometimes even of families and their subdivision.

(iii) The last question: to give an estimate when it will be completed is hazardous to attempt, as this is tied up with the unknown future development of pure science in the world.

Even if the question is framed in a more restrictive sense, viz. by asking for an estimate of how much time and labour is involved, the answer is still hard to give. Long ago I tried to calculate this estimate in a discussion with Danser. We concluded that, if he was exempt from other obligations, an ambitious taxonomist could possibly achieve the revision of an average of 80 accepted species a year, so that the whole work would then involve 300 man/years of work.

This has proved far too optimistic, even taking into consideration that we had in mind then a far more simple style and more concise work than we actually now envisage. Still, superficially, it may appear rather easy to achieve an average of the revision of one species every four days, but in practice this appears, with a single exception, to be a severe over-estimate. By comparison with similar work, a century ago, revisions are, of course, far more time-consuming, because of the enormous increase in literature to be digested, the number of names to be evaluated, the very large amount of material to be administered, and the number of types to be unearthed. The average will thus be closer to 15–20.

I do not believe that the speed of progress depends on the group and that there are easy and difficult groups involving great differences in time required to be spent on them. Difficult aspects may vary but they are always there, either in generic of specific delimitation of taxa, due to variability of taxa, complication through bulky material or extensive literature and synonymy, etc. On the average all families will appear to be approximately equally time-consuming.

Above all, production will depend on personal qualities and conditions. It is true that nowadays hardly any taxonomist can devote all his time to research, except some strong-willed, ambitious persons who resist the loss of time in diffuse, marginal tasks or unnecessary minutiae, and give instead priority to research behind the binoculars in preference to that behind the typewriter. But, indeed, most cannot escape from part-time educational tasks.

Then again there is great variability in production, in that some botanists are able to reach conclusions earlier than others and work more concisely – which is not to say that the first category performs less accurate work. It is partly a matter of experience, partly also of setting aims and claims. Between accuracy and hyper-conscientiousness, there is a wide range of claims, but the time involved in the same sequence is one with distinctly diminishing returns. One has to be practical and make a reasonable choice in degree of accuracy to produce useful work.

Experience has shown also that there are, and have been, relatively, only exceptionally few taxonomists who possess a Benthamian or Hookerian tenacity and balance and are satisfied with and take pride in a life-long production of monographic works.

I cannot refrain from touching on a sociological aspect involved in the future. Many decades ago research positions were reserved for the ambitious small élite. Nowadays, it is obvious that researchers are no longer an élite group, but are just supposed to do a job of eight hours a day. There is a distinct trend in society not to put such a high value on disinterested scientific work as before, a tendency which

contributes to the suppression of ambition. I cannot share the opinion that scientific ambition is equal to the rat-race. I have been brought up under the ideal that disinterested pure science is a noble part of our civilisation in order to understand nature. This opinion may now appear to many as conservative and outmoded.

But this trend is a fact and must not be underestimated as it involves the interest of future generations in taxonomy, which is a distinctly disinterested branch of the natural sciences. The trend is probably in part due to uneasy feelings that whereas mankind expected wonders of science, its achievements have become, in many fields, a disappointment, and in certain aspects are seen as a menace. Not only the man in the street, but also university people now tend to consider whether it should not be so that science must be focussed on welfare, economy, environment and social problems – in short, it should be focussed on what is useful to mankind. This philosophy pervades the education of youngsters from the kindergarten till their doctor's degree and must influence their later thinking on achievement. Therefore, the unravelling of the secrets of organic evolution by the taxonomist may, in the future, not hold the same fascinating attraction it had before, and contributions to pure science slow down accordingly.

To conclude, the estimate of what lies before us to be done to complete the Flora Malesiana, in the face of the unknown future, is at least half a century of work, present conditions remaining the same.

What has been achieved so far in printing or finished MSS, is only one fifth of the total. If other, rather critical precursory revisions and monographs of families or genera listed in the tabulation below are added, the estimate is that about one third of the work has been done.

Let me finish this sketch by answering a fourth question, which emerges from the comment given on the third one.

I should emphasize then, for the uninitiated, that critical plant taxonomy of the tropical flora is extremely important to mankind, especially to its future. Man simply must know his environment holding his essential resources. These resources are three-fold, viz. the substratum (rocks, water and soil), the animal kingdom, and the plants from the unicellular to the highly organized. The latter especially, are of essential importance, in that they form the base of any food-chain in the living world. This makes the study of plants a special asset in man's welfare.

But knowledge of plants and their qualities is only possible by means of their identity, their name, which is the key to all published knowledge about them. And besides the name, it must also be clarified how they can be distinguished from each other.

A scientific survey or inventory of the plant kingdom is, therefore, no cerebral whim of the mind, it is the framing of an indispensable tool, for both pure botany, and for the very many fields of applied botany.

No data on pharmaceutical or medicinal properties, and phytochemistry can be used or checked without a proper name of the plant concerned. The same holds true for all plants used in silviculture, horticulture, agriculture, fruit-culture, fodder, weeds, noxious and poisonous plants, food plants, condiments, and all species used in plant industry, including timber and forest products (gums, oils, resins, fibres, latex, rattans, etc.).

Accurate names of plants must also be available to plant ecologists, to those engaged in the planning of land-use, for plant protection, and for nature conservation. Correct identity of pollen is most useful for geological and archaeological

stratigraphy, and so is systematic wood-anatomy. Recently it has even been found that certain plants accumulate metals in their tissue and can be used as tracers for metals in the bedrock and they may be useful for mining prospectors.

Whereas the tropics represent the largest variety of plants in the world, and man in the tropics is largely dependent on its flora, it is clear that a critical inventory is badly needed, as a basic tool in very many respects. The Rijksherbarium is engaged in framing this tool in the Flora Malesiana, which will prove to be indispensable for the Third World in the Asiatic palaeotropics.

It is our sincere hope that its importance will be well realized, both by the Governments and University authorities concerned and by the young botanists on whose sympathy, enthusiasm, devotion, and capacities it will depend, to bring it, at some future time, to a successful end. They should be aware that by their scientific enterprise they are doing something useful for mankind, whatever plants they work on.

Experience has taught that the usefulness of plants cannot be foretold; also, the importance of usefulness changes with the development of society and its techniques. Several plants may appear to have no clear useful qualities at present, but they may well prove to be useful in the future.

Let it suffice to say that they all belong to the natural resources, which, in the tropics, represent a bottomless reservoir, for the large part yet untapped and still to be discovered.

STATE OF THE FLORA MALESIANA UNION

In the published volumes 4–8 (1948–1978) 123 families were revised in ser. I, Spermatophytes. It appears worthwhile to tabulate those revisions which remain to be done. It seemed instructive to arrange them roughly into a number of categories, in proportion to the amount of precursory work devoted to them. For simplicity I have left out a number of small to very small families which do not contain more than 10–15 species. Those which are supposed to count more than 200 species are marked by an asterisk*, those with over 500 species with two asterisks**.

I. Families under actual revision or almost finished

(a) MSS ready or far-advanced

Araliaceae I
Cunoniaceae
Cyperaceae II (Caricoideae)
*Dipterocarpaceae
Liliaceae I
**Moraceae
Rosaceae I

(b) In the process of revision

(i) In the Rijksherbarium, Leiden

Aristolochiaceae
*Gramineae
Magnoliaceae
*Myristicaceae
Polygalaceae
**Rubiaceae
Sabiaceae
*Sapindaceae
Winteraceae

(ii) By foreign collaborators[1])

*Apocynaceae
*Araliaceae II
(Schefflera)
Begoniaceae
Casuarinaceae
Coniferae
Elaeocarpaceae I
(Elaeocarpus)
Guttiferae I
(Calophyllum)
*Lauraceae
Melastomataceae I
(Memecylon)
Menispermaceae
Monimiaceae
Oleaceae
Opiliaceae
**Palmae
*Pandanaceae
Potamogetonaceae
Rhamnaceae
Rutaceae
Theaceae

II. Families of which almost final or important revisions were published formerly

Ebenaceae
Hernandiaceae
Loranthaceae
Malvaceae
Nepenthaceae
Polygonaceae
Ranunculaceae
*Sapotaceae

III. Families which are not yet under revision

(a) Of which rather substantial precursory papers are published of certain genera or groups of genera

**Acanthaceae
Bombacaceae
Boraginaceae
*Caesalpiniaceae
*Compositae
Eriocaulaceae
**Euphorbiaceae
Lecythidaceae
*Melastomataceae II
Rosaceae II
(Chrysobalanoideae)
Santalaceae
Scrophulariaceae
Sterculiaceae
Tiliaceae
Verbenaceae

(b) Families on which no, or only small or occasional or local previous revisional work has been published

*Annonaceae
Aquifoliaceae
*Araceae
*Asclepiadaceae
Balsaminaceae
Cucurbitaceae
Elaeocarpaceae II
Gentianaceae
*Gesneriaceae
Guttiferae II
Lythraceae
Marantaceae
*Meliaceae
Mimosaceae
Musaceae
*Myrsinaceae
**Myrtaceae
Olacaceae
**Orchidaceae
*Papilionaceae
Piperaceae
Saxifragaceae
Solanaceae
*Urticaceae
Vitaceae
*Zingiberaceae

[1]) Since this manuscript was written an agreement was reached with four collaborators to revise Annonaceae, Bombacaceae, Boraginaceae, and Olacaceae, listed here under III.

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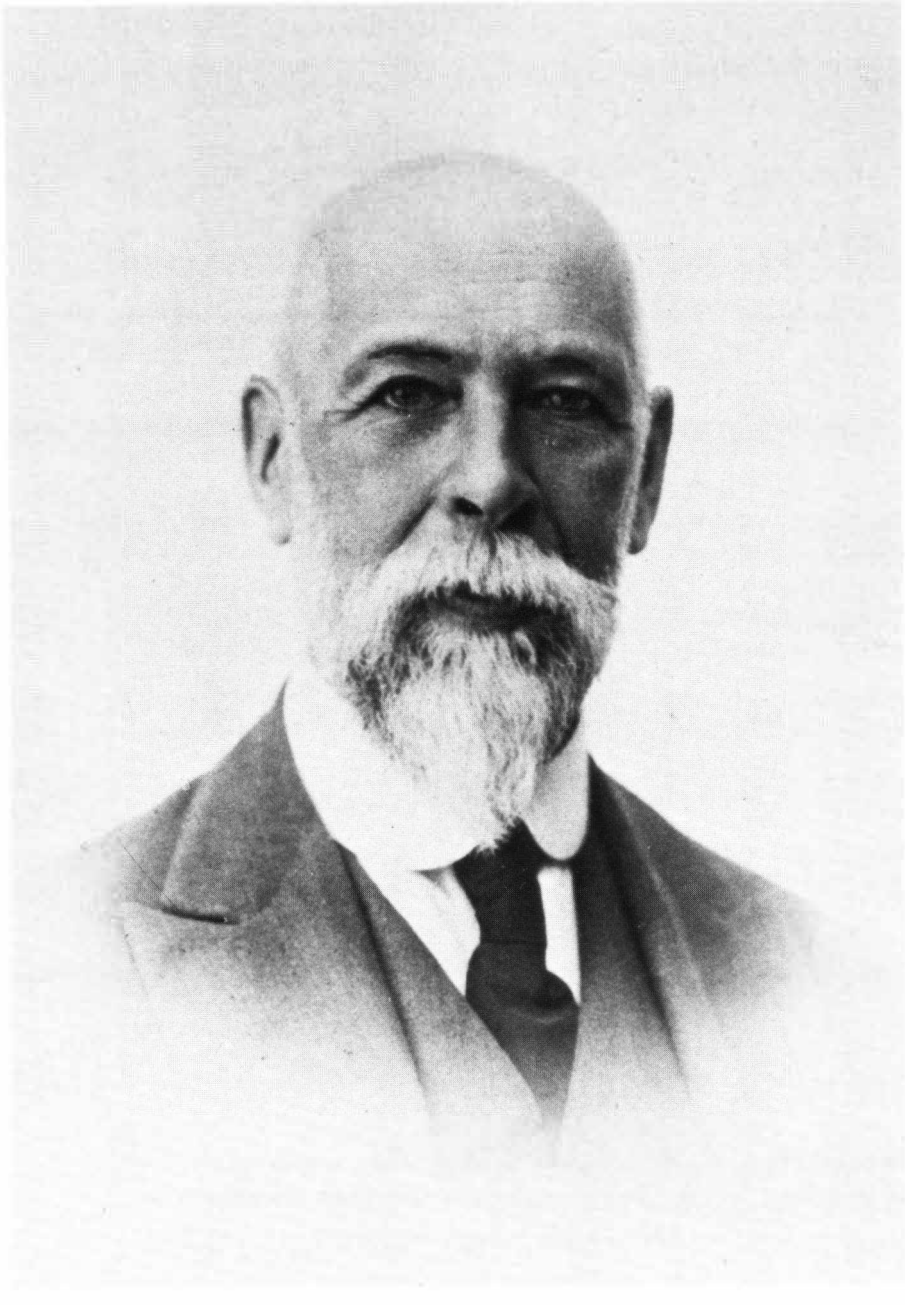

J. W. C. Goethart (1866 – 1938)
Conservator 1897 – 1910, director 1910 – 1932
Reproduced from a photo in the Biohistorical Institute, Utrecht

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CONTRIBUTIONS OF THE RIJKSHERBARIUM TOWARDS THE PLANT-GEOGRAPHY OF MALESIA AND THE PACIFIC

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Rijksherbarium, Leiden

The first substantial contribution of the Rijksherbarium towards the plant geography of Malesia and the Pacific was made by the German born J. G. Hallier in his paper 'Über frühere Landbrücken, Pflanzen- und Völkerwanderungen zwischen Australien und Amerika'. In this paper he suggested that recent land connections had existed in the tropical Pacific from Japan over Hawaii to California and south to Peru and another connection in the south Pacific. His arguments besides botanical were also ethnographical and linguistic.

H. J. Lam was not only responsible for the promotion of taxonomic research. He added chapters on phytogeography to his revisions of the *Sapotaceae* and *Burseraceae*. His papers on the subject always had a philosophical quality. He once compared phylogeny with a stream of potentialities of the genoplasm drifting in time: the genorheithrum (1938). Lam also wrote plant-geographical essays on areas with special interest: Talaud, Celebes (1945) and especially New Guinea (1934). As regards his ideas about past connections between Borneo-Philippines-Celebes-Moluccas-New Guinea he owed much to Merrill. Lam was a follower of Wegener's continental drift theory and he pleaded with fellow taxonomists to accept this as a working hypothesis to explain distribution patterns in the Malesian archipelago (1930). Many of his papers were in Dutch, especially of course those meant for a general (Dutch) public, such as his chapter on phytogeography in Weevers' book (1939) 'Het leven der planten' (The life of plants). He took care, however, to publish his more important ideas in English as well. Among many things Lam will be remembered for initiating a series of distribution maps of Pacific plant taxa: 'Pacific Plant Areas', which was to contain critical annotated maps. These should be a valuable asset to botanists, paleontologists, ethnobotanists and others. This plan was first suggested in 1939 during the sixth Pacific Science Congress at Berkeley, but World War II held up execution of the project. As chairman of the 'Standing Committee on Pacific Plant Areas' Lam gave a progress report after the war (1953). Realization of the project was to be achieved by Van Steenis, his successor both as director of the Rijksherbarium and as chairman of the Standing Committee.

C. G. G. J. van Steenis, like Lam, started his botanical career in Bogor. He is no doubt the most prolific and influential of Dutch phytogeographers. His first great work in the field of plant-geography is his study on the origin of the Malesian mountain flora (1934–36). He came to the conclusion that the Malesian mountain flora had reached the archipelago along three migration routes, which have since become known as the Sumatra, the Luzon, and the Papuan tracks. He also found an explanation for the fact that montane species only occur on mountains surpassing a

certain minimum height where, however, they often descend to much lower altitudes. He called this the 'elevation effect'. On sufficiently high mountains the species have a zone of permanent establishment from where their diaspores may reach lower (or higher) zones but where they do not flower (1961a). This was also found in Swiss alpine plants investigated by the student W. Backhuys (1969). The distribution of drought plants is another subject treated by Van Steenis. He found by correlating species areas with rainfall patterns that seven drought classes could be distinguished among monsoon plants. Species requiring severe drought were found to be disjunct between SE. Asia and S. Malesia with an area of mostly everwet rainforest in between. He argued (1961b) that the gap was bridged by drought 'stepping stones' during the Pleistocene. An important paper is his chapter 'Concise plant-geography of Java' in Backer and Bakhuizen v. d. Brink, Flora of Java 2, 1965, written with the assistance of Mrs. A. F. Schippers-Lammertse. It treats such topics as floristics, vegetation, altitudinal zonation, drought plants, climate etc. Van Steenis is also the first author to study floristic plant-geography based on the total indigenous flora and using the genus as the basic working unit instead of selected species. By studying the distribution of genera in the Malesian archipelago he found three main plant-geographical boundaries (Flora Males. I, 1, 1950). These boundaries ('demarcation knots') are not overstepped in either way by relatively large numbers of genera. Thus were established the limits of the 'Flora Malesiana' area: Malesia. A further subdivision within Malesia is also given. Supplementary papers were written by C. Kalkman (1955) for the Lesser Sunda Islands and by M. M. J. van Balgooy (1960, 1971) for the Pacific, Kalkman showed that the flora of the Lesser Sunda Islands is a depauperized version of the Javanese one, only sparingly supplemented by eastern (Australian) elements.

The ideas of Van Steenis on historical phytogeography are to be found in several papers of which only those on the Kinabalu (1964) and on *Nothofagus* (1971) need be mentioned. A condensation of this thoughts can be found in his extensive paper on the land-bridge theory in botany (1962). To explain the distribution of plants over the earth, especially between the tropical regions, the idea of random long-distance dispersal is rejected, and short-distance dispersal over land (continuous or isthmian) is vigorously defended. Van Steenis's dictum has always been that plant-geographers should not climb on the bandwagon of some geophysical theory. If botanical facts agree with a geophysical model that is fine, if not, geophysical theory should be reconsidered. This is the opposite of Lam's standpoint. Van Steenis made a great contribution to Pacific plant-geography by realizing the publication of 'Pacific Plant Areas' mentioned before. So far three volumes have appeared containing 293 original maps and an extensive annotated bibliography of published maps for which due recognition should be given to Mrs. M. J. van Steenis-Kruseman. Apart from this the revisions by members of the Rijksherbarium staff provide a huge body of plant-geographical facts often illustrated with accurate maps (e.g. M. Jacobs' treatment of *Capparaceae* in Fl. Mal. I, 6, 1960 or C. den Hartog's Sea-grasses of the world, 1970) and sometimes with extensive data on fossil distribution (e.g. C. F. van Beusekom's paper on *Meliosma*, 1971). Other important papers by Van Steenis are his studies on the origin of island floras and on the distribution of mangrove genera. Articles on the plant-geography of S. Malesia, E. Malesia and with Mrs. D. Beintema-Hietbrink on Ceylon are in press.

Van Balgooy studied the distribution of Phanerogam genera in the Pacific and worked out a hierarchical subdivision of the flora. It appears that the greater part of

the tropical Pacific as far east as Hawaii and Marquesas floristically belongs to Malesia. New Zealand and adjacent islands are placed in the Australian Kingdom and so is New Caledonia, albeit in a high hierarchical rank. He also wrote a paper on floristic diversity of islands and edited the third volume of Pacific Plant Areas of which series he is the current editor.

J. Muller's palynological studies are valuable contributions to plant geography. Many of his papers deal with tertiary deposits of Borneo and give an insight into floristic composition of peat swamp forest, eastward migration of mangrove components (1964) and the former presence of northern hemisphere taxa now absent from Malesia (1966). An important contribution to paleobotany is his review of palynological evidence for the differentiation of Angiosperms (1970).

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H. J. Lam (1892 – 1977)
Director 1933 – 1962
Photo in archives Kon. Ned. Bot. Ver., c. 1941

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MYCOLOGY AND LICHENOLOGY AT THE RIJKSHERBARIUM

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Rijksherbarium, Leiden

Soon after the foundation of the Rijksherbarium in 1829 King Willem I of the Netherlands presented the herbarium of C. H. Persoon to this institute. The fungi in this famous herbarium, along with some other collections, among which the tropical fungi collected by F. W. Junghuhn and H. Zollinger, formed the basis for the mycological herbarium. But in the early period of the Rijksherbarium, owing to a shortage of funds and the absence of a curator for the cryptogams, the collections of fungi and lichens were badly neglected and remained in disorder for a long time.

It was the third director of the Rijksherbarium, W. F. R. Suringar (director from 1871 to 1898) who became aware of the omissions in the collections of cryptogams and who took measures to fill the gaps. During his period several series of cryptogamic exsiccata were bought. He also acquired the cryptogamic collections of J. K. Hasskarl and L. H. Buse as well as the well-known lichen herbarium of G. W. Körber. But there still was no one to look after these collections.

All mycological research in the Netherlands during the 19th century was concentrated around the person of C. A. J. A. Oudemans, professor of general botany at the University of Amsterdam. He regularly consulted the fungi in the Persoon herbarium. The main part of Oudemans' mycological herbarium later went to Groningen, but recently it has been deposited on permanent loan in the Rijksherbarium. (Cf. Van Steenis-Kruseman's paper in this volume, p. 29).

At the beginning of this century the collections of cryptogams at the Rijksherbarium were almost inaccessible, as the major part had been stored away in sacks and packets. However, the anticipated visit to the Rijksherbarium of the American mycologist C. G. Lloyd made the rearrangement of the fungi, particularly of the herbaria of Junghuhn, Léveillé, and Persoon a necessity.

In 1906 J. P. Lotsy (director from 1906 to 1909) entrusted W. J. Jongmans with the management of the cryptogamic collections as an unsalaried assistant. The latter had the Persoon herbarium mounted on sheets so as to make it accessible. Soon, however, Jongmans was commissioned to do paleobotanical research. But during 1907 and 1908 Lotsy had on average twenty people employed daily mounting and rearranging the cryptogams.

When Lotsy resigned as director of the Rijksherbarium, his plans for the rearrangement of the collections were adopted by his successor J. W. C. Goethart. All the collections still had to be placed in firmly constructed cardboard boxes. When the Government, however, refused to agree to his first order of 1000 herbarium boxes, Goethart bought them privately and gave them on loan to the Rijksherbarium. Further improvement of the collections was then no longer supported by the Government until much later.

It is less than 60 years ago that mycological research became incorporated in the activities of the Rijksherbarium. It is the merit of the Netherlands Mycological Society (founded in 1908) that the first mycologist was appointed to the Rijksherbarium. On 24 September 1910 the Society decided to accommodate its 'Standard Collection' in the Rijksherbarium, and a curator was appointed.

The first temporary and unsalaried curator in 1910 was F. A. des Tombe. Still in the same year H. A. A. van der Lek officially became curator of the Society at an annual fee of Dfl. 205.– (viz. Dfl. 50,– furnished by the Society and Dfl. 155.– from voluntary contributions by a few members). A yearly contribution of Dfl. 800.– by the Government was considered unwarranted by the Board of Trustees of the University. Under these circumstances Van der Lek did not stay long and 1 September 1913 he took up another position.

Both the Society and the Rijksherbarium owe a great debt of gratitude to Des Tombe and Van der Lek, as they preserved many specimens and studied the fungi (mainly macro-fungi) of the 'Netherlands Mycological Standard Collection'. This collection was meant as an authentic catalogue that could be freely consulted. At the same time it served as a kind of check list of fungi for the Netherlands and as a reference collection for later identifications.

From 1 November 1914 to 31 October 1922 Miss Catherina Cool was curator in charge of the Netherlands Mycological Society at a remuneration of Dfl. 50.– a year. During her curatorship all acquisitions were placed in glass jars, mainly in liquid. Great problems arose during the First World War when a shortage of glassware, paper, and chemicals against insects hampered her work.

After unremitting insistence by the Mycological Society Miss Cool was allowed to continue her post from 1 November 1922 onwards as paid assistant at the Rijksherbarium in Government service. In fact, it is on this occasion that the first position as a mycologist was created on the staff of the Rijksherbarium. Miss Cool remained an assistant till her death in 1928.

Christmas 1922 she made a collecting trip of three months to the Canary Islands together with Mrs. A. den Tex-Boissevain.

In 1929 Miss Cool was succeeded by W. J. Lütjeharms, who wrote a thesis on the mycological history of the 18th century. Like his predecessors, he worked on the mycoflora of the Netherlands and provided materials and descriptions for many contributions to the Flora Batava. He established international relations. From 15 February to 18 September 1936 he went on a collecting trip to the Dutch East Indies, mainly visiting Java and the Island of Engano. Shortly afterwards, in 1938, he accepted a position as professor of botany at the University of Bloemfontein, South Africa.

From 1938 to 1942 J. S. Zaneveld joined the staff of the Rijksherbarium as curator of the mycological herbarium. He became interested in the *Laboulbeniales* of the Netherlands, but gradually shifted his interest. His thesis dealt with the Charophyta of the Dutch East Indies.

In 1942 R. A. Maas Geesteranus succeeded Zaneveld and was also appointed curator of the collections of the Mycological Society. In the beginning, however, he was mainly interested in lichenology and published as his thesis a work on the *Parmeliaceae* of the Netherlands. From 12 March 1949 to 14 January 1950 he was away on a field trip, collecting more especially phanerogams and lichens in Kenya and South Africa. It was not until his return that fungi became the main subject of his taxonomic studies. He set to work to enlarge the collection of fungi which were

placed in loose wrappers. The space- and time-consuming method of preserving fungi in liquid which moreover was found to be unsatisfactory was abandoned.

The larger Ascomycetes (*Helvellaceae*, *Geoglossaceae*, *Peziza*, *Cordyceps*) and the stipitate hydnoid fungi received his special interest. Much of his experience with stipitate hydnoid fungi has been compiled in his books 'Hydnaceous fungi of the eastern Old World' (1971) and 'Die terrestrischen Stachelpilze Europas' (1975).

After his retirement in January 1976 he continued his study of hydnoid fungi and started a revision of the genus *Mycena* for the Netherlands.

It was a great achievement of H. J. Lam (director from 1933 to 1962) and Maas Geesteranus that in the fifties a centre of taxonomical mycology came into being at the Rijksherbarium when respectively C. Bas (1954), M. A. Donk (1956), and J. van Brummelen (1959) joined the staff of that institute.

Through the efforts of Donk and Lam in 1959 the journal 'Persoonia' mainly devoted to taxonomic mycology was inaugurated.

C. Bas has applied himself to the further enrichment of the collection of *Agaricales* of the Netherlands and surrounding countries. In particular he has studied representatives of *Amanita*, *Marasmius*, *Agrocybe*, *Galerina*, and *Squamanita*. He published a thesis entitled 'Morphology and subdivision of *Amanita* and a monograph on its section *Lepidella*' as part of a world wide taxonomic revision of the genus *Amanita*. In 1963 he made a study-tour of four months in the U.S.A. Together with Maas Geesteranus he took part in a mycological collecting trip in India for 10 weeks in 1964.

In 1955 P. Groenhart and H. S. C. Huijsman became honorary associates of the mycological department. Until his death in 1965 Groenhart worked at the Rijksherbarium, studying Malesian lichens, mainly collected by himself. He laid a base for a mongraph of *Cryptothecia*, but the work remained unfinished.

Huijsman has mainly been engaged in the study of European Agaricales and published on several genera (e.g. *Lepiota s.l.*, *Inocybe*, *Ripartites*, *Tricholoma*, *Psilocybe*, etc.). He has brought together an important collection of *Agaricales*, particularly during the period he lived in Switzerland. Recently he has taken up the study of the genus *Inocybe* again.

Of great importance to the scientific development of the mycological department has been the period that M. A. Donk was a member of the staff.

On his return to the Netherlands in 1956, after a career in Indonesia, he became head of the mycological department and started giving lectures in mycology to graduate students. More than once he refused to accept a professorship in order to devote all his time to mycological research. From 1969 to 1970 he spent a year at various mycological institutes in the U.S.A. He worked at the Rijksherbarium until his death in 1972.

The amount of Donk's scientific publications totals more than 2300 pages. With his extraordinary knowledge of many groups of fungi, his juridical mind, and his interest in matters of nomenclature he produced a great number of nomenclatural notes and publications on proposed generic names for Basidiomycetes. In the field of taxonomy his conspectus of the families of *Aphyllophorales*, his notes and check lists on Heterobasidiomycetes and on European polypores should be especially mentioned.

K. B. Boedijn became a regular guest of the mycological department after his retirement in 1958 from a position in Indonesia. He continued his mycological studies at his home in The Hague, in close connection with the mycologists in

Leiden, till his death in 1964. During this period he contributed several publications to 'Persoonia'.

When J. van Brummelen joined the staff of the Rijksherbarium, he continued his studies of coprophilous fungi and prepared a world-monograph on the genera *Ascobolus* and *Saccobolus* (*Pezizales*) as a thesis. He introduced cultural methods and microtechniques into the department. The genera of coprophilous Discomycetes (*Ascobolaceae*, *Thelebolaceae*, and *Ascodesmidaceae*) were especially studied by Van Brummelen. In addition he became more and more interested in broad relationships within the Discomycetes. For this purpose he started comparative studies of fruit-body ontogeny, ascospore ornamentation, and ascus structure in the *Pezizales*.

In 1972 Donk, Bas, and Van Brummelen received financial support from the Organization for the Advancement of Pure Research (Z.W.O.) to start a combined project of ultrastructural research to clear up some of the more fundamental problems in the taxonomy of Basidiomycetes and *Pezizales*. Donk would study cross-walls in Basidiomycetes, Bas spore wall structure in pink- and brown-spored agarics, and Van Brummelen ascus tips and spore walls in *Pezizales*.

Because of the death of Donk, and on account of more advanced studies on agaric spores elsewhere, this project was restricted in the end to the study of the *Pezizales*. The support expired at the end of 1975.

In a series of four publications Miss E. Merkus (1972 – 1976) wrote a thesis on the ultrastructure of the ascospore wall in *Pezizales*. Van Brummelen studied the ascus top in genera of the *Pezizales* with light and electron microscopy.

In 1970 E. Kits van Waveren became a honorary associate of the mycological department. He is interested in the study of European *Agaricales* with special emphasis on the genera *Psathyrella*, *Conocybe*, and *Coprinus*. His critical notes on the genus *Psathyrella* are published in 'Persoonia'.

When W. F. B. Jülich joined the staff of the Rijksherbarium in 1973 to succeed Donk as a curator for the *Aphyllophorales*, he continued his studies of *Tulasnellaceae*, *Corticiaceae*, and aquatic fungi. Since 1975 he has taken up the study of *Tomentella*. Recently he started a comparative study of the submicroscopical shapes of spores, cystidia, and hyphae of *Aphyllophorales* with the help of scanning electron microscopy. He is also preparing a biography of C. H. Persoon. In the beginning of 1978 he took part in an expedition to Borneo for five months, and made a collecting trip in Thailand.

The position originally held by Maas Geesteranus at the mycological department was changed into a temporary one to accommodate a graduate student working for his doctor's thesis. Since February 1976 M. E. Noordeloos has occupied this position and studied the Netherlands representatives of the genus '*Rhodophyllus*' (*Agaricales*), with special emphasis on the subgenera *Entoloma* and *Nolanea*.

Over the years several students, mainly of Leiden University, have studied mycological or lichenological themes at the Rijksherbarium, as candidates for the 'doctorandus' degree.

The most successful of these have been:

A. C. Perdeck (1948 – 1949). Revision of the *Lycoperdaceae* of the Netherlands.

C. Bas (1951 – 1953). The genus *Amanita* in the Netherlands.

J. van Brummelen (1957–1958). Coprophilous fungi of the Netherlands.
E. Hennipman (1958–1962). The genus *Cladonia* in the Netherlands.
Mrs. B. E. E. de Wilde-Duyfjes (1964). Foliicolous lichens in the African tropical rain forest near Yaoundé, Camerouns.
Mrs. J. M. W. V. Luyt-Verhey (1967–1973). The genus *Dasyscyphus* in the Netherlands.
E. J. M. Arnolds (1969–1973). *Hygrophorus* subgenera *Cuphophyllus*, *Hygrotrama* and *Hygrocybe* in the Netherlands.
Miss A. E. Jansen & M. E. Noordeloos (1972–1976). The genera *Marasmius*, *Marasmiellus*, and *Micromphale* in the Netherlands.
L. A. Tjon Sie Fat (1976–1977). Acrophysalides in the tissue of stipe and bulb in *Agaricales*.

Although prospects for mycological research at the Rijksherbarium, with a threatened cutdown of the staff, are less bright than they were in the sixties, there is a wide array of projects in execution and in preparation.
General taxonomic revisions of the following groups are in preparation.
— *Amanita* sect. *Amidella* and sect. *Vaginatae* (Bas).
— *Tulasnella* in Europe and genera of *Corticiaceae* (Jülich).
— *Thelebolaceae* and *Ascodesmidaceae* (Van Brummelen).
Local revisions and treatments of other taxonomic groups for the Netherlands mycoflora are in progress.
— *Rhodophyllus* subgenera *Entoloma* and *Nolanea* (Noordeloos).
— *Agaricus* (W. M. Loerakker, continued by A. M. Brand).
— *Mycena* (Maas Geesteranus).
— *Psathyrella p.p.* (Kits van Waveren).
— *Inocybe p.p.* (Huijsman).
— *Collybia* (Miss A. E. Jansen).
In connection with the taxonomic studies in Basidiomycetes and Ascomycetes, the investigation and the testing of 'new' and 'old' characters and criteria have become of prime importance. Some of these studies, especially those which need great technical skill and availability of expensive instruments, could be regarded as separate projects.
— Studies of spores and asci of *Pezizales* with transmission electron microscopy (Van Brummelen).
— Study of the shape of spores, cystidia, and hyphae of *Aphyllophorales* with scanning electron microscopy (Jülich).
— Fruit-body development in *Pezizales* (Van Brummelen).
With the present shortage of technicians progress of most of these projects is of necessity slow and intermittent.

C. G. G. J. van Steenis (1901 – x)
Director 1962 – 1972
Photo Ruth van Crevel, Rijksherbarium, 1964

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THE RIJKSHERBARIUM AND ITS CONTRIBUTION TO PHYCOLOGY

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In modern handbooks the development of plant systematics is given as occurring in four overlapping phases: the pioneer (or exploratory) phase, the consolidation phase, the biosystematic phase, and the encyclopaedic phase. In systematic phycology research is still largely in the pioneer phase, with scattered attempts to reach the second, third, or even fourth phase. In many cases in phycology the biosystematic phase has to precede the consolidation phase. Knowledge of algae (growing mainly in marine or freshwater environments, but also occurring in soils or snow and on rocks or trees) is quite scanty in most parts of the world, and even for taxa that are supposed to be well known, the information is often but fragmentary. The encyclopaedic phase is for most groups of algae very remote and probably it will never be attained.

Research on algae connected with the Rijksherbarium reflects the phases of systematic phycology.

In pre-linnean times A. van Royen named several species of algae in his Florae Leydensis Prodromus (1740) and several of his Latin phrase-names were used by Linnaeus in his Species Plantarum. The specimens of the Van Royen herbarium are still present in the collections of the Rijksherbarium. In the next century F. T. Kützing described many new species of algae. Like many of his contemporaries he was not aware of the complex polymorphism of many algae, and as a result he described almost any morphological variant as a new taxon. This typological approach was used by most phycologists of that time, also by W. F. R. Suringar, who was director of the Rijksherbarium from 1871 to 1898. Suringar was a wealthy man, and when the Rijksherbarium had no means of purchasing algal collections which were on offer, he bought them privately. He did this with the precious herbarium of Kützing, which contained nearly 30,000 specimens. Inasmuch as there was a rather intensive mutual contact between Kützing and his contemporaries his herbarium comprises several algae originating from collections of e.g., Lyngbye, Meneghini, Greville, J. G. Agardh (Europe), Sonder, Binder & Von Mueller (Australia), Hooker (North-America), and Von Humboldt (South-America). Suringar himself was interested in the sea weeds of Japan, which is expressed in several publications. In his herbarium marine algae from Japan (sent by Gratama & Tanaka) are incorporated together with notes on their use and with water-colours, which are the originals of the illustrations of his Algae Japonicae (1870). A number of algae from the Netherlands are also present in the Suringar herbarium, for the large part collected by Van den Bosch. After his death his collection passed into the hands of Mrs. A. A. Weber-Van Bosse (1852 – 1942). She also mainly used the typo-

logical-hierarchic method, as shown in her 'Monographie des Caulerpes', published in 1898. During her research in the Malay Archipelago in 1899 and 1900 (resulting in her Opus Magnum: 'Liste des algues de la Siboga expedition', 1928) she became aware of the large variability in the algae. She sometimes regretted only having the possibility of studying the morphology of the algae. She would have liked to experiment with them and to study their reproduction in their natural habitat. Over 50 years she built up an extensive herbarium collection, famous among phycologists all over the world. The first enlargement of her collection came during the already-mentioned Siboga-expedition. In collaboration with the specialists A. & E. S. Gepp (*Codiaceae*), Foslie (*Corallinaceae*), Barton (*Halimeda*), and Reinbold (*Sargassum*) she elaborated this collection over the next 25 years. Numerous new species and many new genera were described. Her herbarium was also enriched by many important gifts, such as a number of *Cystoseira* specimens from Sauvageau, algae from the French coasts from Bornet and Thuret, Californian and other algae from Setchell and Gardner, etc. Besides these minor acquisitions and the large collection of Suringar (including that of Kützing), Weber-Van Bosse also succeeded in becoming the owner of the important collection of Hauck and of a part of the herbarium Lenormand (see also Koster 1936, 1948). In 1934 she presented her collection of algae to the Rijksherbarium, making the condition that a special curator for this collection be appointed. This post was offered to and accepted by Miss J. Th. Koster. In the course of many years she rearranged the Rijksherbarium algal collection in such a way that it became very accessible. Type-specimens in particular can now mostly be found easily by means of extensive indexes. She also published taxonomic studies on Cyanophyta and several green algae (Koster 1941, 1955, 1966), and became very much aware of the great variability of especially the Cyanophyta. She was an enthusiastic supporter of Drouet's controversial revisions of Cyanophyta, in which he reduced the total number of accepted taxa from several thousands to less than a hundred.

From 1938 to 1942 J. S. Zaneveld was on the staff of the Rijksherbarium as an assistant for the mycological collection. He graduated, however, on a phycological thesis (1940).

In 1960, C. van den Hoek was incorporated in the scientific staff of the Rijksherbarium. His well-known revision of the European species of the genus *Cladophora* (1963) was based on studies of living specimens in natural surroundings, uni-algal cultures, and herbarium collections. During a stay at the laboratory of Von Stosch in Giessen (B.R.D.) he improved his knowledge of specialized methods of culture and caryology, which he used in his later studies on life-histories (Van den Hoek & Flinterman, 1968). He was also much interested in phyto-geography and phyto-sociology of algae (Van den Hoek 1960, Van den Hoek & Donze 1966, 1967). After his appointment as professor of systematic botany at the university of Groningen he and his staff continued their research in these directions.

In 1966 Van den Hoek was succeeded by W. F. Prud'homme van Reine, who started monographic studies on *Sphacelariales* (Phaeophyceae), focussed on observations on living specimens from nature as well as dried specimens from European herbaria. In culture rooms the morphology of the species is studied as well as life-histories. Ultrastructural studies, numerical taxonomic methods, and phyto-geographic data are also involved (e.g. Prud'homme van Reine 1974, 1978). This sometimes reaches the biosystematic phase, the consolidation phase is, however, still the main purpose. In collaboration with several students he made observations

about the morphology, taxonomy, geography, and ecology of the red algae *Catenella caespitosa* and *Bostrychia scorpioides*.

After the retirement of Miss Koster in 1967, C. den Hartog was appointed in her place. He was a student of prof. J. Heimans at the university of Amsterdam, and graduated in 1959 on a study of the epilithic algal communities occurring along the coast of the Netherlands. In 1963 he was appointed as a specialist of phanerogamic water plants at the Rijksherbarium, and in 1967 he shifted to the department of phycology. Den Hartog applied himself mainly to studies on algae from brackish waters and salt marshes (Den Hartog 1967, 1971, 1973). Several students were involved in these studies, which resulted in a considerable number of reports (e.g. Geesink 1973, Polderman & Prud'homme van Reine 1973, Polderman 1974). When he became professor of aquatic ecology at the Catholic University in Nijmegen in 1973 he still had the opportunity of being involved with phycology. In collaboration with him and with his staff member P. J. G. Polderman the ecological investigations on salt marsh algae have been continued at the Rijksherbarium for several years resulting in a considerable number of student reports.

Den Hartog was succeeded by G. M. Lokhorst, who took his doctor's degree in 1974 on the thesis 'Taxonomic studies on the freshwater species of *Ulothrix* in the Netherlands' at the Free University of Amsterdam. Lokhorst continued to study at the Rijksherbarium the brackish-water and marine *Ulothrix* species of Western Europe. In his monograph (1978) five species were extensively treated. These investigations were carried out on living specimens in their natural habital, uni-algal cultures, and herbarium collections. In these studies the life-history, growth in culture, cross-breeding, ultrastructure, and phyto-geography were involved. So this monograph is more or less in the fourth or encyclopaedic phase, but several aspects like cytology are still missing.

Plans and prospects

Apart from the continuation of taxonomic and autecological research on *Sphacelariales*, *Ulotrichales*, *Chaetophorales*, and salt-marsh Rhodophyceae, attention will be given to phyto-geographical research in the southeastern part of the North Atlantic Ocean. This so-called CANCAP-project started in 1977 and was made possible by joining a marine biogeographic expedition to the Canary Islands. In the years to come such expeditions will be continued.

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BRYOLOGY AND BRYOPHYTES AT THE RIJKSHERBARIUM

A. TOUW
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Research and management

The main task of the first directors of the Rijksherbarium consisted of the preparation of a catalogue of its Dutch East Indian and Japanese collections (cf. van Steenis-Kruseman's paper in this volume). Among those who contributed to this catalogue was J. H. Molkenboer, a young physician who had graduated on a botanical thesis in 1840. From that year until 1846 he worked on vascular plant collections of the Rijksherbarium and got permission from its director (C. L. Blume) to devote part of his time to bryophytes. He sorted and arranged the Asian collections and started their identification together with his friend and colleague F. Dozy. In 1844 their first precursory paper appeared ('Muscorum frondosorum novae species ex archipelago indico et Japonia'). They then trained a draughtsman and made a first attempt to prepare an illustrated survey of the moss flora of the Dutch East Indies and Japan. During the daytime they looked after their patients and during the evening and part of the night they worked on mosses. After the first instalment had appeared of their 'Musci frondosi inediti archipelagici indici, etc.' (1845 – 1854) the university of Leiden awarded Molkenboer a honorary doctorate. They started a much more elaborate survey of the Dutch East Indian moss flora of which the results were to be published in their 'Bryologia Javanica, etc.' (1854 – 1870). They intended to distribute specimens of species described in this work together with it. Unfortunately, Molkenboer died in 1854 after the prospectus and the first instalment had been distributed. Dozy continued the work but when he died in 1856 only ten instalments had been printed.

Though Molkenboer and Dozy are best known by these publications they also published several smaller papers on Malesian mosses and liverworts, on Dutch bryophytes (culminating in their treatment of the Musci in the first edition of 'Prodromus florae Batavae'), and they published a 'Prodromus florae bryologicae Surinamensis' (1854). The latter was largely based on F. L. Splitgerber's collection in the herbarium of the university of Leiden. This serves as an example that they did not restrict themselves to the collections of the Rijksherbarium. Nowadays all collections concerned are found in that institute.

The remainder of 'Bryologia Javanica' was edited by R. B. van den Bosch and C. M. van der Sande Lacoste. They too were physicians by profession and friends of Molkenboer and Dozy. Van den Bosch (who was related to Dozy by marriage) also published important papers on phanerogams, ferns, lichens, and algae. When he died in 1862 the completion of 'Bryologia Javanica' was left to van der Sande Lacoste who also published papers on malesian liverworts (of which his 'Synopsis Hepaticarum Javanicarum', 1856, must be mentioned here) and the chapter on

bryophytes in Miquel's 'Prolusio florae Japoniae' (1866 – 1867). He spent much of his time in the field and published many papers on Dutch bryophytes. He treated the Hepaticae in the first edition of 'Prodromus florae Batavae' (1851); the treatment of the bryophytes in its second edition (1893) was based on his revision of the herbarium of the 'Botanische Vereeniging' (Dutch Botanical Society). Little is known for certain about contacts of Molkenboer, Dozy and van den Bosch with bryologists in other countries. Van der Sande Lacoste exchanged letters and specimens with many of them and accumulated a very large herbarium. In the collections and files of the Rijksherbarium is evidence of contacts with J. G. Bamberger, E. Bescherelle, J. C. Breutel, V. F. Brotherus, A. Geheeb, C. M. Gottsche, E. Hampe, P. T. Husnot, F. C. Kiaer, J. F. Laurer, E. Levier, A. F. Le Jolis, S. O. Lindberg, P. G. Lorentz, C. B. Massalongo, J. P. F. C. Montagne, A. Rehmann, A. E. Sauter, W. P. Schimper and F. Stephani, and no doubt more names will turn up when his herbarium is thoroughly scanned. It is interesting to note that no evidence has been found with regard to contacts with C. Müller (Halle) and W. Mitten, both very prominent bryologists and working in the same field as van der Sande Lacoste.

When van der Sande Lacoste died in 1887 there was no one to follow in his tracks, and until c. 1925 interest in bryology in the Netherlands was almost nil. During this period V. F. Brotherus (Helsinki) identified extra-European bryophytes from the Rijksherbarium collections.

The revival of bryology in the Netherlands was no doubt influenced by a rapidly growing popularity of phytosociological and floristic research. W. H. Wachter (a high school teacher) strongly stimulated and facilitated bryological work. He provided numerous identifications to others and between 1928 and 1943 he published a series of papers on Dutch bryophytes and on the history of bryology in the Netherlands, mostly mentioning his friend P. Jansen as co-author but in fact written by him alone. He re-arranged the Dutch bryophyte collections of the Rijksherbarium and the Dutch Botanical Society and identified large numbers of (mainly Dutch) bryophytes for the Rijksherbarium. At his death in 1946 he left behind an incomplete manuscript of a liverwort flora of the Netherlands.

From 1943 to 1957 J. J. Barkman was appointed to the staff of the Rijksherbarium. He devoted part of his time to its bryophyte collections but he was primarily interested in phytosociological research and had to spend much time on teaching duties. He composed his magnum opus 'Phytosociology and ecology of cryptogamic epiphytes' (1958) and many smaller floristic, taxonomic, and ecological papers on bryophytes from the Netherlands and other parts of Western Europe.

In 1950 the 'Flora Malesiana' project was started and plans were made for a bryophyte series to be edited by R. van der Wijk (professor of general botany at the university of Groningen). The director of the Rijksherbarium (H. J. Lam) tried to create a position for a full-time bryotaxonomist and curator of the bryophyte collections at the Rijksherbarium and he succeeded in the end. In 1963 his and Barkman's pupil A. Touw was appointed, six years after Barkman had left and one year after Lam had retired. He was to prepare revisions of moss groups for 'Flora Malesiana', in collaboration with R. van der Wijk and B. O. van Zanten at Groningen. However, it soon became obvious that a restriction to the area covered by 'Flora Malesiana' would be a too narrow and inefficient approach. A large proportion of the species concerned extend far beyond that area and for a better

understanding of relationships many taxa from adjacent areas had to be incorporated. Therefore, the plan for a bryophyte series of 'Flora Malesiana' was abandoned in 1966 and it was decided that revisions would be made for a bryogeographically better delimited area, including Malesia and, depending on the group concerned, parts of continental Asia, the island groups in the Pacific Ocean, and Australasia. Thusfar, Touw has published a monographic revision of the *Hypnodendraceae* and partial revisions of *Neckeropsis* (*Neckeraceae*) and several genera of *Thuidiaceae* (*Thuidium*, *Pelekium*, *Rauiella*). At present, the Australasian species of *Thuidium* are being revised. A world-wide revision of the *Rhizogoniaceae* will follow.

Between November, 1965, and February, 1966, Touw collected c. 4150 bryophytes in Thailand as a member of the 'Thai-Dutch Botanical Expedition 1965/66'. From March to May, 1975, he participated in a joint expedition of the Papua New Guinea Division of Botany and the Rijksherbarium to the Papua New Guinean part of the Star Mountains. From April to June, 1978, he executed bryological field work in Sarawak as a member of the (British) Royal Geographical Society's Mulu Expedition.

From c. 1945 onwards bryology has become popular in the Netherlands, and the collections of Dutch bryophytes in the Rijksherbarium and other herbaria are growing very fast. Unfortunately, the most recent critical survey of the composition of the Dutch bryoflora and the distribution of bryophytes in the Netherlands was published in 1893 (in the second edition of the 'Prodromus florae Batavae'), and has become completely outdated. Taxonomic concepts have changed, many species have become very rare or extinct, and others have been added to our flora since.

In 1976 W. V. Rubers was appointed as a temporary research associate to the Rijksherbarium in order to fill this gap. He is preparing a revision of the collections of Dutch Musci (excluding *Sphagnum*) from the larger institutional and private herbaria. He receives the collaboration of a small group of colleagues throughout the country who work up groups of their own speciality. The results will be summarized in a moss flora of the Netherlands containing keys, descriptions, and concise details on distribution, ecology and variability. Besides, distribution maps will be prepared of all species, The acrocarpous mosses (excluding the Bryales) will be worked up between 1976 and 1979. If the necessary funds can be found the remaining groups will follow between 1979 and 1982. From the results already available it appears that our herbaria contain many misidentified specimens (which comes as no surprise) and that our impressions of the frequency, distribution, and sometimes ecology of our species clearly need to be changed. Of some species all records have shown to be false. On the other hand several species not previously reported from the Netherlands have turned up. A few species have become more widespread since the early 19th century and many are on the decline or appear to have become extinct in the Netherlands.

Bryophyte taxonomy at the species level and below strongly depends on the use of vegetative characters. These, however, may show great phenotypic plasticity and deviate in juvenile and depauperate stages, thus obscuring genotypic differences. In order to obtain information on these phenomena cultivation experiments have been started in 1978, using a phytotron constructed in the Botanic Garden of the university of Leiden. Attention will be focused on plants responding well to the artificial climate offered and belonging to groups of closely related taxa.

Collections

In the bryophyte herbarium Hepaticae and Musci are kept separate, and the same holds for the collections from the Netherlands vs. those from elsewhere. All specimens are kept in packets and stored upright in strong cardboard boxes, except c. 67,000 Musci which are mounted on sheets (cf. p. 98). Within these-subdivisions the bryophytes are alphabetically arranged.

Detailed information on the origin of the component parts of the bryophyte collections is often scanty or absent. Much can be found in the surveys of the collections of the Rijksherbarium given by M. J. van Steenis-Kruseman in this volume and by W. A. Goddijn in Mededeelingen van 's Rijks Herbarium, Leiden, No's 62a and 62b, 1931.

Among the oldest bryophyte collections are those in the herbaria of C. H. Persoon and G. F. Kaulfuss. The former was presented to the institute by King Willem I but how the latter has come to Leiden is not clear. Already in 1862 material from it had been examined by van der Sande Lacoste. Both collections contain numerous duplicates (often isotypes) from the herbaria of early 19th century bryologists such as J. Hedwig, C. F. Schwaegrichen, C. G. D. Nees von Esenbeck, C. F. Hornschuch, J. F. Ehrhart, J. C. Schleicher, etc. Unfortunately, most specimens are poorly labeled.

During the first fifty years the core of the bryophyte collections consisted of the (separate) herbaria of Japanese plants (coll. H. Bürger, Pompe van Meerdervoort, Ph. F. von Siebold, and C. J. Textor) and plants from the Dutch East Indies (coll. C. L. Blume, J. C. van Hasselt, F. W. Junghuhn, P. W. Korthals, H. Kuhl, C. G. C. Reinwardt, A. Zippelius, H. Zollinger, and many others). The flow of incoming Asian bryophytes diminished to a trickle after c. 1865.

Important collections from other areas acquired during that period are the coll. Persoon mentioned before, F. L. Splitgerber and H. C. Focke's bryophytes from Surinam, and the herb. Schultes. The latter contains numerous German cryptogams, but also specimens from other parts of the world such as South African bryophytes from the collections of J. F. Drège, C. F. Ecklon and K. L. P. Zeyer.

The herbaria of van den Bosch, Dozy, Molkenboer, and van der Sande Lacoste constitute the most important 19th century acquisitions of the bryophyte collections of the Rijksherbarium (cf. p. 93). Their Dutch collections were deposited in the herbarium of the Dutch Botanical Society. That herbarium contains nearly all important 19th century Dutch bryophyte collections. From 1871 onwards it has been housed in the Rijksherbarium, and on that occasion the non-Dutch specimens in it were presented to the Rijksherbarium.

From 1871 to 1898 W. F. R. Suringar was director of the Rijksherbarium. He was a friend of van der Sande Lacoste, and the latter probably advised him when he started filling the gaps in the cryptogamic collections. Many important collections from all over the world (mainly series of exsiccatae) were acquired, often bought by the director at his own expense. Among those acquisitions are a large number of specimens sent by W. P. Schimper, and South American plants collected by P. W. Korthals and by Suringar himself. In 1888 the heirs of L. H. Buse ceded his collections to the Rijksherbarium, on condition that the Dutch specimens were to be presented to the Royal Botanical Society. Buse had been an eminent amateur bryologist who issued a series of exsiccatae and built up a very large herbarium of mainly European bryophytes which a.o. contains many specimens from J. Juratzka and C. A. J. Milde.

During the first decades of the twentieth century the acquisition of bryophytes continued in a much less successful way than before. No funds were obtained to buy the herbarium of A. Geheeb; it went to Berlin where it was destroyed in 1945. Likewise, no funds were found to buy the bryophyte herbaria of M. Fleischer (c. 30,000 specimens) and V. F. Schiffner (c. 50,000 specimens). Fortunately, these collections of utmost importance to students of Southeast Asian bryophytes are accessible now in the Farlow Herbarium (Cambridge, U.S.A.). In 1949, the Rijksherbarium obtained a set of c. 1300 duplicates of Schiffner's malesian Musci, and of course the institute has a set of the exsiccatae issued by Fleischer. During this period the most important acquisitions from the tropics were duplicates of collections made by Th. Herzog (Bolivia, Ceylon), J. Elbert (Lesser Sunda Is.), A. D. E. Elmer (Borneo, Philippines) and Philippine material distributed by E. D. Merrill. From Europe, the Rijksherbarium obtained c. 3000 Belgian bryophytes from the herbarium of P. J. F. Gravet (the largest set outside Belgium), and the Dutch bryophyte herbarium of D. Lako.

Between c. 1930 and 1950 the acquisitions mainly consisted of exsiccatae and Dutch material. Several private herbaria were obtained (coll. T. R. Broeksmit and W. H. Wachter), and Barkman added much to the herbarium.

As a direct result of the start of the 'Flora Malesiana' project collecting was started in Indonesia and from 1952 onwards large numbers of specimens were sent from Bogor to the Botanical Laboratory at Groningen and the Rijksherbarium. One year later an extensive exchange of bryophytes was started between the Rijksherbarium and the Hattori Botanical Laboratory at Nichinan (Japan), the centre of bryological research in Asia. In 1959 van Zanten collected bryophytes during the Dutch expedition to the now Indonesian part of the Star Mountains, New Guinea, on behalf of the Rijksherbarium.

In 1963 the institute possessed a large bryophyte herbarium rich in type specimens but of a rather ill-balanced composition. Most collections from Indonesia dated from the first six decades of the 19th century when large parts of the area had been hardly touched by explorers. Thanks to Merrill's extensive distribution of duplicates the Philippine collections were reasonable, but of collections made in other parts of Malesia only few were represented in the Rijksherbarium. Continental Asia, the Pacific island groups, Australasia, Africa, and tropical and South America (excluding Bolivia and Surinam) were represented by valuable but small and old collections. There were large collections rich in 19th century specimens from Europe and rather large ones from North America. The collections of Dutch bryophytes in the Rijksherbarium and the herbarium of the Dutch Botanical Society were by far the richest in the Netherlands.

From c. 130,000 specimens in 1963 the bryophyte collections have increased to c. 210,000 specimens in 1978. Large collections were obtained by donation or in exchange for identifications. However, the exchange of duplicates is the main source of important acquisitions and takes much time. The sorting is a time consuming job and duplicates for exchange must be at least provisionally identified, unidentified bryophyte material being very unpopular among curators because of the difficulty of getting it named.

The acquisition of material from Malesia and adjacent areas has top priority, followed by material from other parts of Asia, Australasia, the Pacific island groups, and Africa. No particular efforts are made to obtain material from tropical

and South America, that being the area studied by colleagues at the Utrecht herbarium.

Large malesian acquisitions are coll. W. Meijer (c. 12,000 specimens from Sumatra, Java, and Borneo), west malesian duplicates from the Bogor herbarium and coll. R. van der Wijk, and many, often small collections from Papua New Guinea (a.o. duplicates of coll. R. G. Robbins including type material of numerous species described by E. B. Bartram). Material has been received from nearly all parts of Malesia, but Celebes, the Moluccas, the Lesser Sunda Islands, and the Indonesian part of New Guinea remain lamentably underrepresented areas. The acquisitions from East and South Asia include a.o. the exsiccatae of Japanese bryophytes issued by the Hattori Botanical Laboratory, duplicates of Himalayan bryophytes collected by the University of Tokyo expeditions, and coll. C. Ruinard from Ceylon.

Large numbers of Australian bryophytes were sent by the Canberra Botanic Gardens (coll. H. Streimann). Several rather large collections were received from New Zealand and Pacific island groups (e.g. duplicates of coll. W. Schultze-Motel from Samoa).

The African collections were improved by large collections from South Africa (duplicates of coll. M. R. & C. Crosby and P. Vorster) and smaller ones from Malawi (coll. H. R. & C. Feijen), Tanzania (duplicates of coll. T. Pócs), various other parts of continental Africa, Madagascar and the Mascarenes.

The collections of Dutch bryophytes have grown strongly too. Most amateur and professional bryologists deposit duplicates of notable discoveries in the Rijksherbarium and several private herbaria have been bequeathed or donated to it: coll. E. Agsteribbe, S. Groenhuijzen and A. N. Koopmans (each counting c. 4000 – 5000 specimens), and coll. C. J. Booy, E. C. H. Kolvoort and B. J. Reichgelt (c. 1100 – 2300 specimens).

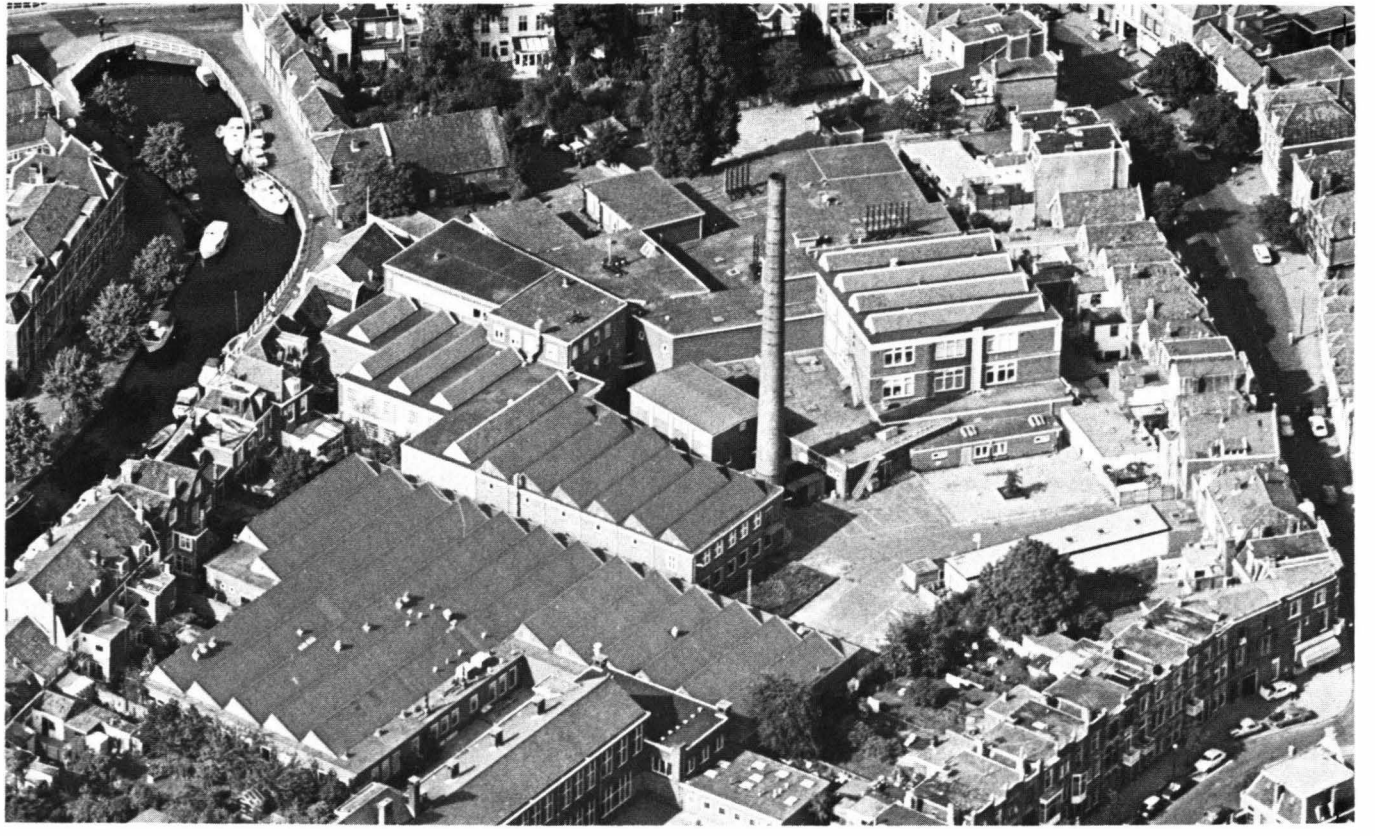
Though Hepaticae are not intentionally neglected most acquisitons are Musci since bryological research at the Rijksherbarium is presently restricted to that group. Nevertheless, large numbers of unworked malesian Hepaticae are accumulating and it is strongly hoped that someday a hepaticologist can be appointed to work up this material.

Around the turn of the century it had become very hard to get access to the material because the old collections from the Dutch East Indies, the Japanese herbarium, the 'general herbarium', the herbarium of the university of Leiden, and a number of other collections had been kept separate. Between 1907 and 1912 all collections of the Rijksherbarium were united and rearranged, and the bryophytes were (re)mounted on sheets measuring 22.5 by 30 cm (half the size of the sheets used for vascular plants). In 1950 this procedure was abandoned and bryophytes were put in packets. A remounting of the specimens on sheets was started but at present c. 67,000 Musci remain to be done.

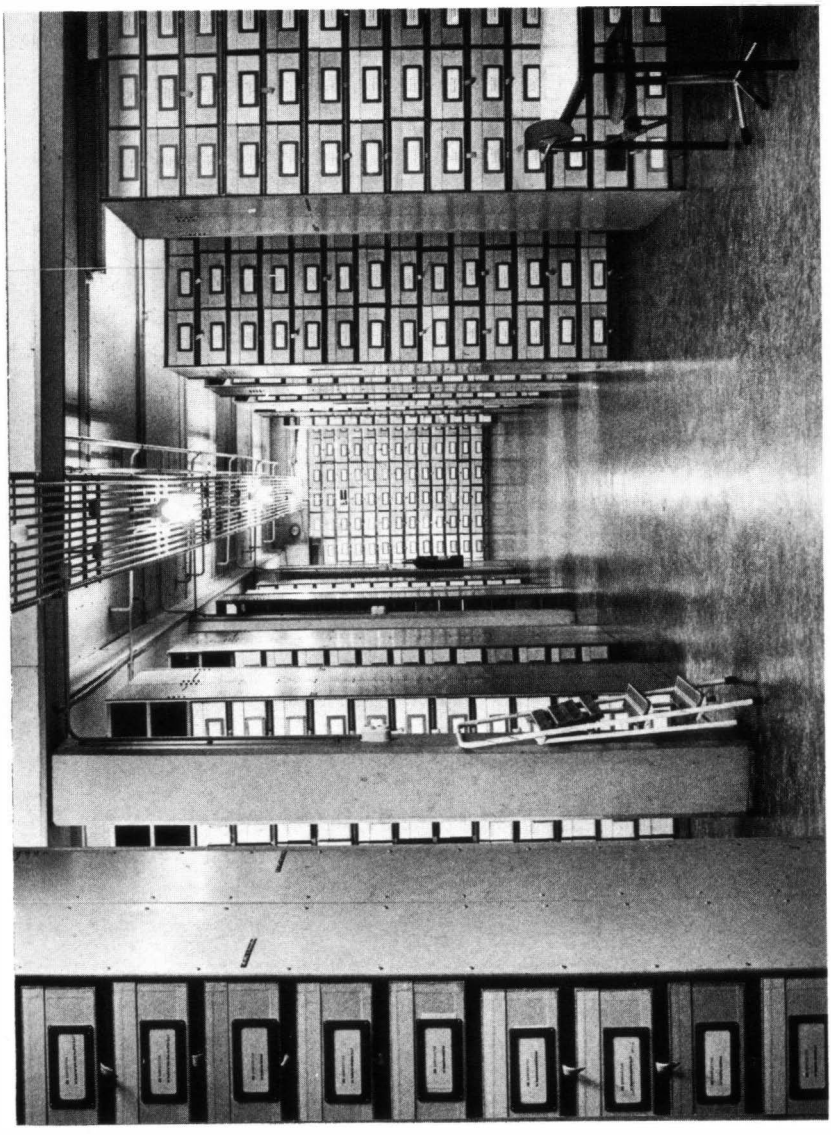
During the remounting in 1907 – 1912 the names of the Musci were brought up to date using Paris' Index Bryologicus. Unfortunately, this work had to be done by people without any bryological training. Nasty mistakes have been made, particularly where homonyms were involved. Thus, most collections of *Dicranum bonjeanii* De Not. were stored under *Ceratodon purpureus* (Hedw.) Brid. by confusing *Dicranum palustre* B & S (= *D. bonjeanii*) with *D. palustre* Brid. ex Schum. (= *Ceratodon purpureus*). A start has been made with a revision of the nomenclature of the moss collections, but c. 80% of the labels remain to be checked.

The curation of the fast growing and for a long time somewhat neglected collections is a source of worry, considering the lack of sufficient assistance by technicians. In 1973, some relief was found in the appointment of W. J. Holverda as botanical assistant. He spends 50% of his time on bryophytes, making routine identifications of European material, sorting new exotic collections, and revising the nomenclature of the old collections of Musci.

The front door of the Rijksherbarium. This small house is part of the so-called Provisorium, a former textile-factory. The complex is hardly visible from the street. Photo Ruth van Crevel, Rijksherbarium.



Aerial photograph of the Provisorium, which houses the Rijksherbarium and some other departments. It is situated in a residential neighbourhood and closely surrounded by houses. Photo Frans Rombout, Leiden.



The herbarium is stored in stout cardboard boxes shelved in open racks, not in pigeon-holes in closed cupboards as in most herbaria. The 13th and 14th row, out of reach for most people, were intended as a reserve. In some places they are already in use. Photo Ruth van Crevel, Rijksherbarium.

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THE COLLECTIONS OF PTERIDOPHYTES AT THE RIJKSHERBARIUM

E. HENNIPMAN
Rijksherbarium, Leiden

Since the foundation of the Rijksherbarium, pteridophytes have been an important part of the total collections. Blume, the first director, had a special interest in ferns. In 1826, when he returned to Europe from his stay in Java, he took with him large collections of well preserved pteridophytes which he had gathered there himself. These, together with the fern collections of Van Hasselt, Kuhl (both from Java), and Zippel (Java, Moluccas, New Guinea), were all deposited in the Rijksherbarium.

Blume's studies on the ferns of Java, both in the wild and in the herbarium, were published before the foundation of the Rijksherbarium in the second fascicle of the 'Enumeratio Plantarum Javae et insularum adjacentium minus cognitarum vel novarum' (1828) in which the author enumerated 500 species of ferns and fern allies of which, apart from many new varieties 338 were new to science. Moreover, five new genera were proposed: *Kaulfussia* (a synonym of *Christensenia*), *Gymnosphaera*, *Diacalpe*, *Arachniodes*, and *Stegnogramme*. Although no keys are provided, the concise descriptions are diagnostic and meet the highest scientific standards. For nearly all the taxa, additional information on the habitat or the precise locality is given. No words can better illustrate the high quality of Blume's work then by stating that most of the species at present recognized as being native to Java, are included in the 'Enumeratio'. It was indeed the first critical fern flora for a tropical region, convincingly displaying the enormous diversity to be found in circumstances of a warm climate and high humidity. The 'Enumeratio' was followed by the Flora Javae (1828 – 1851) in which Blume illustrated over a hundred fern species – nearly all of them for the first time – on 96 hand coloured folio plates of which the typography, especially of the first fascicles, is superior.

In these early years the fern collections were further enriched by Von Siebold (Japan) and Korthals (various parts of Malesia, but especially Sumatra), to mention only the most important contributions of that time.

A new era set in when Miquel succeeded Blume in 1862 and made the fern collections available to Mettenius, professor at Leipzig, no doubt one of the most brilliant pteriodologists that ever lived. Apart from Miquel's contributions, the latter's publications in the 'Annales Musei Botanici Lugduno-Batavi' again showed the historical collections to be a rich source of study, and of vital importance for the progress of fern systematics. From that same period date the annotations on the *Hymenophyllaceae* by Van den Bosch, a medical doctor at Goes who got his botanical training from Reinwardt, author of several important papers relating to this group.

When Suringar became director (1871 – 1898) large collections of tropical pteridophytes were acquired through exchange and by purchase. As a result, especially through the acquisition of many specimens from tropical Africa and America, the general character of the pteridophyte herbarium greatly improved.

In the first half of this century, activities around the pteridophyte collections at Leiden became markedly quieter. The paleotropical ferns in the Rijksherbarium were between 1915 and 1922 all annotated by Rosenstock, professor of botany at Gotha. Merrill supplied a large number of fern-duplicates from the Philippines, of special interest since the complete destruction of the Manila herbarium during World War II. From the many specimens brought together by the many botanists that explored the Dutch East Indies at that time, only duplicate material was sent to Leiden, the first set being deposited as a rule in the herbarium at Buitenzorg (e.g. those of Van Alderwerelt van Rosenburgh, Lörzing, Bünnemeyer, Van Steenis, and many others). For the Rijksherbarium this trend had the logical consequence that the steady increase of collections received through exchange came practically to a halt. On the other hand, the herbarium at Buitenzorg was able to augment their Far Eastern collections considerably; they are now well preserved in the new building of the Herbarium Bogoriense. Apart from Bogor, rich collections from Malesia were brought together in the private collections of the leading pteridologists of that time, e.g. Christ, Christensen, and Copeland, later acquired by Paris, the British Museum (Natural History), and the University of Michigan, respectively. It is regrettable that through lack of funds (or opportunity?) the Rijksherbarium was unable to obtain at least one of these important and unique collections that could have been a worthy addition to the classic material already present in Leiden.

After the last War, however, a revival of interest in the study of the pteridophytes in Leiden gradually became apparent. Many new specimens, especially from New Guinea were obtained. This was the result of numerous expeditions in that area, e.g. the expeditions by Brass (Archbold expeditions), the Forestry institute in West (formerly Dutch) New Guinea and especially that in Lae (East New Guinea). Also, the Rijksherbarium itself has organized extensive expeditions since 1954 to that island (by Van Balgooy, Kalkman, Van Royen, Sleumer, Veldkamp, Vink, and others). The duplicates that became available from that source made it possible to revive successfully the old policy of exchange not only with marked results for the number of specimens acquired, but also broadening scientific contacts on an international scale.

A long cherished wish to appoint a special curator for the pteridophytes was realized under the directorship of Van Steenis (1962 – 1972). Apart from various teaching activities in the biology curriculum at Leiden university E. Hennipman set up a special library for fern taxonomy, and started re-arranging and pre-identification of the fern collections. Since 1971 he was assisted in this work by the honorary collaborator G. J. de Joncheere.

Close co-operation was established with the Royal Forest Herbarium at Bangkok in 1965. By the joint organization of several expeditions in Thailand (Smitinand, Phenghkhlai, Hennipman, Van Beusekom, Geesink, and others) many ferns were included in the Rijksherbarium. The collection of Thai ferns became even more

representative through exchange with Thai ferns collected by botanists from the Kyoto University (Tagawa, Iwatsuki, and others).

Further noteworthy recent contributions to the Rijksherbarium were made by several botanists to mention only W. J. J. O. de Wilde and B. E. E. de Wilde-Duyfjes (Sumatra), Price (Philippines), Jacobs and Kostermans (Malesia), and De Joncheere (his private herbarium mainly with ferns from Europe, South Africa, and Ethiopia). Exchange programs exist with other international herbaria concentrating on Malesian ferns like the British Museum (Natural History), London, the Royal Botanic Gardens, Kew, the Smithsonian Institution, Washington and especially the herbarium at Kyoto.

The ferns accumulated in the Rijksherbarium now include apart from the invaluable historical collections from Blume's time, a representative collection of ferns in general with an emphasis on Southeast Asia. It is regularly consulted by leading pteridologists of our time, whereas its study is, already for nomenclatural reasons, imperative for the pteridologists from various countries now involved in monographic studies or revisions for the Flora Malesiana.

Revisions of Malesian Pteridophyta are published in Ser. II of Flora Malesiana. Volume 1 (1959 – 1978) contains treatments by its editor, Prof. Holttum, Kew (introductory chapters, *Gleicheniaceae*, *Schizaeaceae*, *Cyatheaceae*), Prof. Kramer, University of Zürich (*Lindsaea*-group), and the late Dr. A. H. G. Alston, London (*Isoetes*). The first volume will be completed by the *Lomariopsis*-group (Prof. Holttum, all genera except *Bolbitis* which is done by Dr. Hennipman). Ferns now under study by collaborators include the *Blechnaceae* (Prof. Chambers), *Davalliaceae* (Mr. De Joncheere, Rijksherbarium), *Grammitidaceae* (Dr. Croxal, Cambridge, U.K.), *Hymenophyllaceae* (Prof. Iwatsuki, University of Kyoto), *Pteridaceae* (Prof. Kramer), and the *Polypodiaceae* (Dr. Hennipman).

Since Hennipman became curator he has published on several small genera including *Pteridoblechnum (Blechnaceae)*, *Todea (Osmundaceae)*, *Austrogramme (Adiantaceae)*, as well as on the ultrastructure of the spores of *Bolbitis*. His main object of study was, however, the classification within the genus *Bolbitis* (*Lomariopsidaceae*) on which a world-monograph was published in 1977. For this study a great number of plants could be taken in cultivation thanks to the co-operation with the Leiden Botanical Garden.

At present Hennipman is involved in the systematics of the *Polypodiaceae*, a large group recognized as one of the difficult taxonomic groups urgently in need of research. During the last few years extensive analyses have been prepared on several characters, including types of venation pattern, types of rhizome scales, and types of spores. The latter have been studied jointly with Dr. T. Sen (who received a visitor's grant from the Dutch Organization for the Advancement of Pure Research Z.W.O.), using scanning and transmission electron microscopy which gave very interesting results pertaining to the general classification within the genera. Further, gametophytes of *Polypodiaceae* are now being studied under experimental conditions (in a so-called phytotron) in the Leiden Botanical Garden.

Three graduate students have taken up genera of Polypodiaceae for monographic work: *Belvisia*, *Drymoglossum* (which will be included in *Pyrrosia*), and *Platycerium*. On the latter genus some publications have also appeared by De Joncheere and Hennipman.

The Asian *Davalliaceae* are the main object of the studies of De Joncheere. A first contribution on *Humata* has been published (1977).

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MORPHOLOGY AT THE RIJKSHERBARIUM

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In the following the role of morphology, anatomy and palynology in systematics at the Rijksherbarium will be discussed, as far as flowering plants are concerned. It will be demonstrated that most of the research in this field is rooted in the interest of individual workers, and that no planning was involved until recently. The scope of it varied, as it was done either for pure taxonomic purposes, or for systematic and phylogenetic reasons, or for its own merit. Chiefly, I think, the study of morphology s.l. originated because Suringar, Hallier, Lotsy, and especially Lam, were interested in achieving a more natural or evolutionary system of the Angiosperms. Lotsy and Lam extended their interest to the other Cormophytes as well.

In 1895 W. F. R. Suringar published a booklet which was intended as a summary of his lectures. His idea was that the tree of natural affinities could be a preparation and a guide to a real genealogical tree. He pictured this tree with a number of main branches, each of them bearing a number of ramification systems. He adorned this tree with a winding red line connecting groups of plants from different ramification systems. Formerly these groups had been arranged in a linear sequence of increasing complexity by A. P. de Candolle.

H. Hallier, who was at the Rijksherbarium from 1908 till 1922, published his ideas in 1912, and illustrated them by a – as he called it – phylogenetic tree. According to Hallier groups like Choripetalae, Gamopetalae, Apetalae, and Amentiferae cannot be used to subdivide the Dicotyledonae. It was his opinion that Apetalae and Amentiferae should be distributed over different phylogenetic branches. As a whole the Angiosperms would be monophyletic, originating from groups that have some affinity with the fossil *Bennettitales*. Hallier elaborated on these views by making use of morphological and anatomical characters, such as the form of the flowering axis, the form of the ovules, the reduction of the integuments, the structure of the embryo, the arrangement of the pollen tetrads and the number of colpi on the pollen, the position of the sclereid layer of the testa, as well as vegetative anatomical characters, such as the perforation type of the vessels and the pattern of vascular bundles in petioles, etc. He used these data for the discussion of affinities of plant groups. This was done in the fashion of Engler and Prantl's Pflanzenfamilien. Also some chemical characters were taken into account. I have the impression that Hallier mostly evaluated and used the available anatomical knowledge, but that he also added data from his own investigation (*Crypteroniaceae*).

Three publications by J. P. Lotsy (1904, 1906, 1907–1911) are of interest to the present subject. Lotsy worked on these publications while being reader of botany at Leiden university, and director of the Rijksherbarium for a short period. Lotsy recognized three phases in botanical science, firstly the descriptive phase, secondly

the comparative phase in which the affinities by descent are established, and thirdly the phylogenetic phase comprising genetics, evolution, and paleontology. The work Lotsy did during his stay at the Rijksherbarium falls in the second phase. His work follows that of Hofmeister. It is the study of Cryptogams and Phanerogams in their evolution from 'single to double beings' (W. A. Goddijn), which means the evolution of the alternation between haploid and diploid periods during the 'life cycles' of the organisms. Lotsy was especially interested in the comparison of gametogenesis, embryogenesis, pollination and fertilization processes, using cytological methods mainly. While being at Bogor he had published on the 'life history' of *Gnetum*. The expression 'Auxiliary Forces of Systematics' was coined by Lotsy, meaning anatomy, cytology, paleobotany, etc. Certainly Lotsy could not be called a strict systematic botanist, his interest lay far more in the course and processes of evolution. Later his work entered his 'third phase', and he became an experimental breeder of plants, trying to explain the genetical connections between successive generations. The last (fourth) volume of his 'Stammesgeschichte' was never finished. It is interesting to note that in his 'Stammesgeschichte' there is a chapter on the ontogeny of flowers, which deviates from the general line of the book. I am convinced that this chapter was accomplished with the aid of J. W. C. Goethart, who at that time was conservator at the Rijksherbarium. The chapter closely resembles Goethart's thesis on the development of the androecium of the *Malvaceae* (1890). However, Goethart never continued with this kind of work.

The vivid interest H. J. Lam (director from 1933 – 1962) took in extensive floral morphological investigations is evidenced by his contributions to the flora of the Malay Archipelago, especially those on the *Burseraceae-Canarieae* and the *Sapotaceae-Madhuceae* (published from 1931 – 1938). Lam thought that meiomery and pleiomery could not be explained by differences between floral sectors only, but that differences in the supply of nutrients to the whorls of floral organs should play a part as well. Features of obdiplostemony Lam adduced to 'contractive reduction' of centripetal and centrifugal androecia, as did Čelakovsky (Lam was always keen on conveying his ideas in apt new terms). Apart from floral morphology, the stipules had Lam's interest, and that led to the concept of 'metastipules', being stipules that would have evolved from pseudostipules. This led to further study by P. W. Leenhouts and the co-operation on the subject with F. Weberling in recent times. Lam also investigated the composition of the vascular bundles in leaf-petioles and in flowers. Lam used his morphological results to assess evolutionary advance of the 'taxa' he recognized, defining a 'specialization index'. At first he thought that this index had no taxonomic or phylogenetic value, but later under the influence of W. Zimmermann he changed his mind to the contrary. In *Burseraceae*, as well as in *Sapotaceae*, he found correlations between groups of species in remote parts of the area with certain derived characters. In diagrams he plotted the evolution of these groups against geographical distribution. He realized that 'features can travel independently through space and time'. As a continuation he set himself to construct phylogenetic trees of Cormophytes, which were three-dimensional representations, using perspective drawing-techniques (1936, 1938).

Deeply impressed by the 'new morphology' of H. H. Thomas, Lam (1948) published his theory of phyllospory and stachyospory. This theory was an extension of a division of the Gymnospermae into Phyllospermae and Stachyospermae by the paleobotanist Sahni. Lam extended the theory to all Cormophytes, including the Angiospermae. As a result there was no need any longer to explain the Angiosper-

mous flowers either by the euanthium theory or the pseudanthium theory, because the Angiosperms were biphyletic from groups of Pteridosperms. Fossil remains from the lower Cretaceous were adduced in favour. With the new morphology a confrontation between idealistic and realistic methods in floral morphology started. It was Lam's constant concern to find out in how far 'typological' considerations could be translated in phylogenetic terms. And also in how far morphological-anatomical arguments could be valid in rejecting or corroborating the deductions from paleobotany in the understanding of the reproductive structures of higher plants. Especially on the last issue Lam's attitude has been ambiguous, often he advocated more precise morphological research (s.l.), and at the same time he argued that morphological facts (alone) cannot prove a phylogenetic development (1954, 1959). Lam's theory has met with strong opposition, even abuse. Two considerations pleaded very much against it, firstly the very special process of the double fertilization present in all Angiosperms is strongly in favour of a monoreithry of the Angiosperms, and secondly the fact that some groups, like *Cycadeoidea* and some Angiospermous groups, were stachyosporous in the female sex, and phyllosporous in the male, which seems to be evolutionarily impossible. Furthermore the integuments of the ovules could find their place in the theory only with difficulty. Later Lam thought that organs of a nature intermediate between axes and leaves may exist. He also added some views on the evolution of the leaf-axillary axes units in the Cormophytes, which he extended to the Angiospermous flowers. On balance I think that the fate of the theory of stachyo- and phyllospory was that it was rooted in the concept of idealistic morphology and its irreducable categories of leaves and stems. Lam's work shows on every page a struggle between the old idealistic morphology and a new realistic one. Without comment Lam considered the male scales of Conifers phyllosporous for the reason that they are arranged in spirals! Secondly I think it was the fate of his theory that it could not be based on 'sound morphological facts', as these were claimed by his traditional opponents.

Some time after World War II the diversification of the Rijksherbarium started as a result of Lam's wide interests. It was his idea to transform the Herbarium into an Institute for Systematic Botany in a wide sense. Later this line was pursued by C. G. G. J. van Steenis. In some of his students Lam aroused a strong interest for morphology. Many taxonomic works were preceded by ample morphological notes, some are even richly provided with them, for instance W. Vink's studies of the *Winteraceae*. Also C. Kalkman's 'Mossen en Vaatplanten', being a thorough student-handbook on the structure of Cormophytes, has been characterized as 'Lamian' in outlook (F. Jonker).

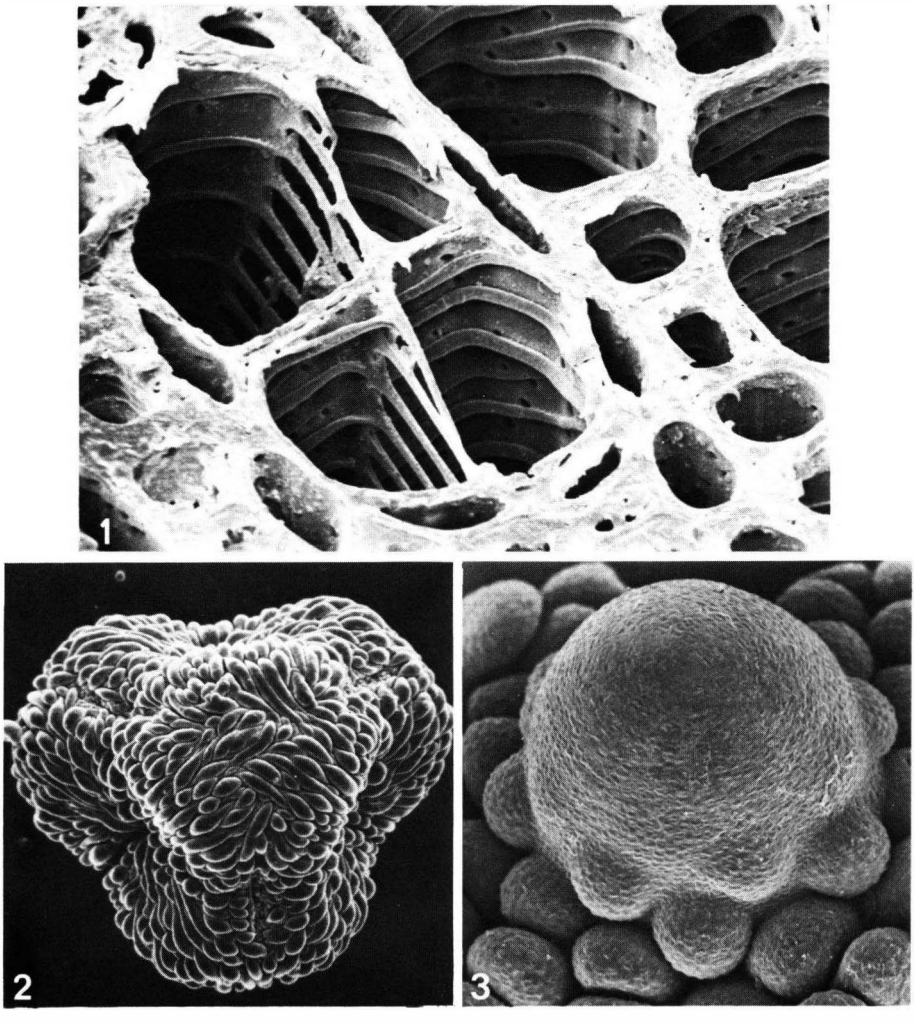
With the appointment of W. A. van Heel, J. Muller, and P. Baas as staff-members, study of the morphology of the Angiosperms was added to the research-program of the Rijksherbarium. The subject of Van Heel is floral morphology. A study on the androecium of the *Malvales* was published in 1966. This was a study of comparative development and the pattern of vascular bundles, and it was followed by a second, theoretical, paper. Lam had always shown a great interest in dichotomy. His pupil L. van der Hammen had written on 'ancient traces of dichotomy' (1948). Another paper on dichotomy, connected with the funicles of *Adansonia*, contained general viewpoints (Van Heel, 1974). The problem of dichotomy is considered to be intimately related to the structure of the stamens. Subsequently the large flat stamens in the *Nymphaeaceae* were anatomically in-

vestigated. According to the idealistic morphology they are homologous with foliage leaves, and from such stamens the commonly terete stamens of all Angiosperms must be derived. The outcome of the studies was that there is no reason to translate the classical concepts in a phylogenetic sense. The large flat stamens must be regarded as a specialization for their groups, they may even have evolved from terete microsporangiophores themselves. The two consistent pairs of pollen sacs are evidence of a double dichotomy. In the *Malvales* stamens occur which are three times dichotomous, partly in three dimensions, or partly flattened. Sterile ramifications occur on the dichotomous stamens of *Ricinus* and *Durio*. Dichotomy is thought to persist through continuous evolution in a few cases, and to become expressed anew in certain other cases in connection with special conditions of life.

As regards gynoecium morphology, a start was made to make visible the complicated primary development of the floral apex and the pistil, by the use of ultropak photography and scanning electron microscopy. It is thought that concepts of 'fusion' have to be formulated as developmental processes which must be compared with each other.

Finally the discovery of distal subdivisions of integuments should be recorded. This may represent a relic form of Pteridospermous stock. Among others it was found in *Scyphostegia borneensis* (1967) and in *Scaphocalyx spathacea* (1973), both possibly ancient monotypes.

As regards the palynological research, which was started by J. Muller in 1967, the relationship with taxonomic projects was most important. The study of the *Ochnaceae*, *Sapindaceae*, *Dipterocarpaceae*, and *Crypteroniaceae* (already studied by Hallier in 1910) should be mentioned in the first place. Furthermore Muller studied the pollen morphology in *Icacinaceae*, *Anacardiaceae*, and *Lecythidaceae*. Mostly this was done in co-operation with students or foreign guest-workers (a.o. S. K. Baksi, D. Lobreau-Callen). A question of general interest is the degree of correlation that may exist between pollenmorphological characters and other characters, or with the accepted taxonomic subdivision of the group under consideration. In *Ochnaceae* there proved to be a partial correspondence on the level of tribes and subtribes of the family. In *Lepisanthes* (1970) there is a correspondence on the level of four subgenera; and there is also correspondence with the migration scheme of the genus, isolation and endemism giving deviating pollen types. Witin the *Dipterocarpaceae* the pollen characters agree with the data from wood anatomy as regards the distinctness of taxa, but not as regards their level of advancement. By this kind of work the Rijksherbarium has been enriched with a large collection of pollen slides. In recent years the use of the scanning electron microscope has considerably extended the results obtained with the light microscope. Transmission electron microscopy has also been introduced and provides important details on the ultrastructure of the exine. Before he came to the Rijksherbarium Muller had gathered knowledge of fossil pollen of the tropical Cretaceous and Tertiary, and he used these data for a reconstruction of the history of the vegetation and the understanding of the present phytogeography. Muller (1970) published a paper that became well-known on the palynological evidence for the evolution of the Angiosperms. From his knowledge he could evaluate and compile the relevant data. The Angiosperm pollen is in the first place characterized by the evolution of columellae. He concluded that a slow single major radiation gave rise to the Angiosperms in the lower Cretaceous. The possibility remains that the Angiosperms started earlier, namely in the upper Jurassic by the *Magnoliales*. By the end of the Cretaceous all major



Scanning electron micrographs of three objects studied at the Rijksherbarium. 1. Vessels in the wood of *Ilex aquifolium*, showing scalariform perforations, spiral wall thickenings, and pits. 2. Pollen tetrad of *Magonia glabrata* (*Sapindaceae*), with rugulate tectum. 3. Stamen primordia on floral apex of *Magnolia stellata*.

groups were present. The herbaceous life form appears to be of Tertiary origin.

P. Baas entered the Rijksherbarium in 1969. His task was the study of vegetative anatomy. Interest in vegetative anatomy at the Rijksherbarium is not new. As early as 1875 J. G. Boerlage had earned his doctor's degree with a thesis entitled 'Bijdrage tot de kennis der houtanatomie' (Contribution towards the knowledge of wood anatomy) supervised by Suringar. This thesis in Dutch gives a very comprehensive history of the microscopical study of wood structure and includes many relevant data ignored by biohistorians (e.g. it gives credit to Nathan Henshaw for observing xylem elements for the first time in 1661). In another section of his thesis Boerlage reported on original wood anatomical studies of the *Artocarpeae* (*Moraceae*). The critical and careful conclusions of relevance for systematic anatomy in general that he derived from this study are still valid.

In a short time Baas made important contributions to the taxonomic work of the institute, often in co-operation with students or with foreign guest workers (W. C. Dickison, C. T. Johnson). His main work, until now, was on *Ilex* and putative relatives (thesis, 1975). Another large study on the wood of the *Myrtales* was recently carried out by G. J. C. M. van Vliet. The question of the correlation of vegetative anatomical characters with other characters must be answered differently for different plant groups. The leaf anatomy of *Ilex* did not agree with the old taxonomic subdivisions, which may, however, be obsolete. In the *Icacinaceae* three levels of specialization in wood and pollen coincide, but leaf characters behave differently and partly agree more with traditional taxonomic subdivisions. In the *Rhizophoraceae* the recognition of three distinct groups and a fourth heterogeneous assembly is corroborated by wood anatomy. In general, wood anatomy seems to correlate less with flower characters than pollen does. The anatomical work on genera of doubtful affinity ('incertae sedis') has formed an important part of the anatomical work (*Hua* and *Afrostyrax; Sphenostemon*, *Oncotheca* and *Phelline; Paracryphia* etc.) and in fact prompted the large-scale study on *Ilex*. In *Ilex* positive correlations were found between several wood anatomical characters and latitude and altitude of provenance of the species involved. These results, in combination with current ideas on evolutionary trends in xylem anatomy induced further studies centred on the inseparable problems of ecological, functional and phylogenetic anatomy. Baas (1976) thinks that there may be 'patio ludens' in the evolutionary diversification of wood characters, but that at the same time selection pressure by the physical environment may have been considerable. As with pollen morphology, the use of the scanning electron microscope became increasingly important, especially in connection with the study of vestured pit morphology in the *Myrtales*, but also for the study of intriguing alveolar material of cutinaceous nature overlying the cuticle proper and occluding the stomata in the *Winteraceae* and *Myristicaceae*. The comparative anatomical work at the Rijksherbarium has stimulated the fast growth of the wood slide collection indispensable to the systematic anatomist.

The introduction of the study of morphology, anatomy, and palynology has strongly augmented the contacts with colleagues in the Netherlands and all over the world, especially in connection with the International Association of Wood Anatomists and the International Commission for Palynology.

Since in 1979 the Rijksherbarium has put into use its own scanning electron microscope which will serve as a technical means of prime importance in the near future, a plate is added to the present contribution, which shows some photographs relevant to the subjects discussed.

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Title-page of one of the Rijksherbarium's treasures, the 16the century Rauwolf herbarium. The herbarium consists of four books and was collected by the physician Leonhard Rauwolf (c. 1540–1596), mainly in the Near East and the Mediterranean. Only the fourth volume has a beautiful, coloured title-page. Photo C. Marks, Rijksherbarium.

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THE RIJKSHERBARIUM AND ITS CONTRIBUTION TO THE RESEARCH ON THE NETHERLANDS AND EUROPEAN FLORA

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In the first decades of its existence the interest of the Rijksherbarium was certainly not directed towards the study of the Dutch and European flora. The initiative to embark on research of the flora of the Netherlands was born outside the walls of the institute. In 1845, R. B. van den Bosch initiated – elsewhere in Leiden! – the foundation of the 'Vereeniging voor de Nederlandsche Flora' (Society for the Netherlands Flora), later the 'Nederlandsche Botanische Vereeniging' (N.B.V.), to promote the knowledge of the flora and encourage the collection of plants for a 'Vereenigingsherbarium'. This herbarium would house the main research materials for the composition of a flora of the Netherlands, which was the original target of the N.B.V.

The N.B.V. was to play a dominant role in the study of the Dutch flora. During the 150 years of its existence, the Rijksherbarium contributed significantly to studies of the Dutch and European flora in only three periods marked by the activities of, respectively, Suringar, Goethart (and Jongmans), and Van Ooststroom (and Reichgelt). Moreover it must be remembered that these botanists were also involved in other studies during their employment at the Rijksherbarium.

Remarkably enough W. F. R. Suringar's activity was greatest in the period preceding his directorship of the Rijksherbarium (1871–1898). From 1857 onwards he was curator of the Vereenigingsherbarium, which formed the basis for the first Dutch pocket flora, published by him in 1870. Immediately after assuming his duties at the Rijksherbarium he negotiated with the N.B.V. to move the Vereenigingsherbarium to his institute. His efforts were successful, contrary to earlier ones by his predecessor F. A. W. Miquel. Perhaps this was also because of the serious crisis which the N.B.V. went through at the time: the lecture commemorating the 25th anniversary of the N.B.V. in 1871 was attended by only 4 people! With a short interruption the herbarium of the N.B.V. has always been in the Rijksherbarium. This led to the peculiar situation that until 1912 there was no reason for the Rijksherbarium to build its own collection of plants from the Netherlands. The members of the N.B.V. donated by tradition their private collections to the Society and so the Rijksherbarium sheltered an important, ever growing collection. In 1948 collections of dried plants were donated to the N.B.V. for the last time: by Joh. Jansen (2519 specimens) and by C. G. G. J. van Steenis (2919 specimens). Now the Rijksherbarium itself is the grateful recipient of such donations.

Although Suringar must have been of great influence in botany in the Netherlands – he was president of the N.B.V. from 1881 until 1897 – his own contribution to the study of the Dutch flora was greatly restricted by numerous administrative duties. However, he created an atmosphere at the Rijksherbarium which was favourable for others (e.g. L. Vuyck), to carry out important studies of the Dutch flora.

His successor J. W. C. Goethart had a more direct influence on the study of the Dutch flora. He was a remarkable character, who combined an immense knowledge with much exaggerated self-criticism. Jansen and Wachter thus wrote in his obituary: 'Hence much of his work was published only when he had a friend beside him'. In 1887–1888 this was J. D. Kobus, with whom he continued the latter's publications on the Dutch *Carex* species, and in 1898 Vuyck, with whom he gathered all sorts of data on topographic maps of the Netherlands. Finally W. J. Jongmans was to co-author a first set of distribution maps of Dutch plants in 1902, inspired by 11 maps on the distribution of Dutch *Carex* species published by Kobus in 1886.

Until 1907 a total of 488 distribution maps appeared. Thereafter the production came to a halt for several reasons. The departure of Jongmans to South Limburg, where he was appointed to the governmental mining survey, must have been an important factor.

The inventory work for which Goethart in 1902 sollicited the co-operation of floristic workers united in the N.B.V., was continued after 1907 by the latter only on a very limited and haphazard scale. The stimulus that the Rijksherbarium, i.e. Goethart, should have given was lacking. No doubt this also had something to do with the various developments within the N.B.V., which led to the removal of the Vereenigingsherbarium to the Colonial Institute in Haarlem from 1912–1925. In the twenties J. L. van Soest and W. C. de Leeuw revitalized the mapping work on the Dutch flora, and in 1930 Goethart even consented to pass on all data and materials concerning the 'Plantenkaartjes van Nederland' including the (copy)rights to an independent foundation, the 'Instituut voor Vegetatie Onderzoek van Nederland' (I.V.O.N., Institute for Vegetation Research in the Netherlands). However, Goethart himself (!) became the first president of this foundation, of which De Leeuw was secretary, and Jan G. Sloff the representative of the N.B.V.

Goethart's own interests mainly focussed on the Dutch flora, especially on problems of speciation through hybridization, a field of study pursued from earlier contacts with J. P. Lotsy. Adverse influences in the N.B.V. had induced Goethart and Lotsy to propose a splitting of the Society into a 'floristic' and a 'biological' division. Similar adverse forces were met by Goethart when he tried to acquire an experimental garden for his studies. In my opinion one should doubt whether it was only Goethart's 'extreme scientific modesty' (cf. Van Steenis-Kruseman, elsewhere in this issue) which prevented him from becoming the 'father of experimental taxonomy'. From all sources it appears that Goethart, himself, lacked the drive typical of a great man. It is significant that a year after his death the then staff members of the Rijksherbarium Miss J. Th. Koster and S. J. van Ooststroom decided to create space by destroying an important part of Goethart's collections of mainly dried hybrid material which was poorly labelled and had suffered from insect attack. This action had the approval of W. A. Goddijn and M. J. Sirks, and created room for 122 (!) herbarium boxes.

Goethart's successor H. J. Lam found a 'rather sleepy repository of dried plants' (Kalkman, in his annual report of 1977). This would soon change. The relatively small staff of scientists was given more general tasks beyond the care of a special family. S. J. van Ooststroom, appointed in 1934, took an active part in composing the directives for reorganization. Miss Koster and Van Ooststroom sorted out collections of Dutch plants, requested by Lam for the re-establishment of international exchange. Through his expert knowledge of the Dutch flora, which Van Ooststroom had acquired in his student days – in 1936 he donated 6000 plants to the Rijksherbarium! – his participation in this task was automatically required. It was Van Ooststroom too who embarked on a treatment of the Pteridophytes for the Flora Neerlandica in 1942. This flora project was the result of a preparatory work by a committee chaired from 1940 onwards by Lam, and was launched in 1945 on the occasion of the 100th anniversary of the N.B.V. Meanwhile a substantial manuscript on the genus *Cuscuta* in the Netherlands had been prepared for publication.

Besides his work for the Dutch flora, revision work on the Malesian *Convolvulaceae* was to remain the main task of Van Ooststroom for many years. Following a 7 months trip to Indonesia in 1950 to collect materials and data on *Leguminosae*, 'a group which Dr. Van Ooststroom intended to revise for the Malesian region' according to Lam in his annual report, the next year's report reads: 'Van Ooststroom continued his *usual* (italics by the author) tasks, including the preparation of a bibliography on Malesian *Leguminosae* and the further revision of *Convolvulaceae* for Flora Malesiana'. Correctly Kloos wrote in these years that outside the circle of biologists, the Rijksherbarium was little known in our country.

Yet the seed for the greater renown of the institute, especially outside the circle of professional botanists, had meanwhile been planted through Van Ooststroom's involvement in the schoolfloras of the Netherlands. In 1946 W. H. Wachter, the co-author and revisor of both the Illustrated and the Concise Schoolflora of the Netherlands, and honorary staff member of the Rijksherbarium (he initiated the 'Personalia' collection), suddenly died. While sorting out his library, Van Ooststroom met the publisher of the floras who happened to visit Wachter's widow to offer his condolences. The publisher eagerly invited Van Ooststroom to continue Wachter's work as no arrangement had been made for further revisions of the floras. From then onwards the preface of both floras included a sentence, which would not only increase the fame of the Rijksherbarium, but also the correspondence of what later was to become the department for the Netherlands Flora: 'Those in doubt of the correct identification of a plant found in the wild, can send it, alive or dried, to my address: Rijksherbarium, Nonnensteeg 1, Leiden'.

Officially the department 'Flora Neerlandica' was mentioned in Lam's annual report of 1954 for the first time. With the appointment of Th. J. Reichgelt as scientific officer and R. M. van Urk as administrative assistant, one can rightfully refer to a department in that year. However, much important work on the Dutch flora had already been done by Van Ooststroom before that date, mostly under the auspices of the K.N.B.V. (K. now standing for the predicate Koninklijk – Royal) in which society he held several offices and served on some committees.

With Reichgelt's arrival work on the Flora Neerlandica, for which the third instalment was prepared, could continue at a higher speed. Unfortunately this work came almost to a standstill when Reichgelt died in 1966. Meanwhile in 1956, Van Ooststroom and Reichgelt had started the publication of a mimeographed Cor-

respondentieblad (News Letter) for floristic and vegetation studies in the Netherlands, succeeded in 1961 by the printed bimonthly Gorteria.

Thanks to the economic boom it was possible to appoint J. Mennema in 1965, three years before the official retirement date of Reichgelt, to enable him to be introduced to the work on the Dutch (and European) flora and to make a start with monographic revision work on the genus *Lamium*. With the untimely death of Reichgelt these plans could not materialize. Due to increasing service work of the department to answer enquiries and help visitors, he became involved in routine work only one year after his appointment.

An effort to revitalize the Flora project by the appointment of F. A. C. B. Adema in 1968 on a grant from Z.W.O. (the Organization for the Advancement of Pure Research) obtained through the K.N.B.V. did not result in the desired effect, because of insufficient time to prepare the rough drafts for publication. Only in 1975, thanks to the help of the present director of the Rijksherbarium C. Kalkman, could a new instalment be published. It concerned the genus *Taraxacum* (the *Vulgaria* excepted) treated by J. L. van Soest, who had worked as a honorary staff member on the European flora from 1948 onwards, and his two collaborators A. Hagendijk and H. A. Zevenbergen.

Van Ooststroom retired in 1971 and Mennema became head of the department with Adema filling Van Ooststroom's vacancy. They were soon to experience the effects of the Nature Conservation year 1970 (N 70). Increased interest, also from the government, demanded information on the botanical significance of certain areas. This necessitated the development of a method involving intensive, but not time-consuming, floristic inventory work. The method based on observations per square kilometre was also used in the studies by postgraduate students aimed at establishing the nature and position of the borderline between two phytogeographical districts as proposed by Van Soest in 1929. 'N 70' also brought renewed requests for distribution maps of individual species. As a consequence Mennema started to complement the phytogeographical I.V.O.N. maps with data from the herbarium collections and the literature as a preliminary for the 'Atlas of the Netherlands Flora'. Thanks to a substantial grant from the Ministry of Culture, Recreation and Social Service, and with the assistance of the Central Bureau for Statistics the first part of the Atlas can be expected soon.

By coincidence the Rijksherbarium received many large Dutch herbarium collections after Van Ooststroom's retirement. Since a high standard is maintained for the insertion of Dutch material at the species level, safeguarding proper consultation by visitors, Adema had to devote much of his time to checking of identifications of this material. Incoming collections still imply a heavy burden for the staff members of the department for the Netherlands Flora. Fortunately the appointment of W. Holverda in 1973 to work for half days on Dutch plants brought some relief in this respect. Together with Adema he just manages to name the plants sent in yearly.

Everyone who takes notice of the fact that the intervals between the new editions of the Flora van Nederland become shorter and shorter, and that the circulation of Gorteria increased from 925 in 1970 to 1300 at present, can conclude that an active network of floristic botanists, mostly amateurs has been established in the Netherlands. Each of them contributes in his or her way to the knowledge of the Dutch flora and uses the Rijksherbarium department as the centre for floristic studies. This is also demonstrated by the well-attended Saturday excursions, organized by the

department in co-operation with the K.N.B.V. This is gratifying but it puts also a heavy claim on research time. Reading through the annual reports it is striking that the number of visitors to the department for the Netherlands flora from 1974 to 1977 rose from 60, 72, and 128 to 199. This together with the fact that on Van Ooststroom's retirement in 1971 the staff was in effect reduced from 3 to 2, makes any scientific research virtually impossible.

It is clear, that where the contribution to the taxonomic study of the Dutch flora must be considered insufficient, research on the European flora is even less significant, being hampered as it is by other duties. Progress in the revision of *Lamium* is, consequently, very slow.

Fortunately time has always been reserved for participation in great European projects. Thus Van Ooststroom acted as Regional advisor of the Flora Europaea and as Member of the Committee for Mapping the Flora of Europe (later succeeded by Mennema and Adema). Also full support was given to the preparation of a list of endangered European plant species, on the initiative of a party of the Council of Europe, in which Mennema participated.

After the death of David van Royen (1727 – 1799, professor of botany from 1754 to 1786) the University of Leiden came in the possession of his large collection of water-colour plates. The plate here reproduced, Sprekelia formosissima, was painted by Laurens van der Vinne (1712 – 1742). Photo C. Marks, Rijksherbarium.

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APPENDIX 1. SCIENTIFIC PERSONNEL

This appendix lists all persons who can be considered to belong or to have belonged to the scientific staff, from 1829 till now. Honorary collaborators are included, if their appointment was more or less official (this is sometimes not quite clear, however). Also included are the staff-members not paid by the university but by private foundations, by official bodies like the Netherlands Organization for the Advancement of Pure Research (Z.W.O.), etc. Student-assistants are not included. Technicalities of ranks and promotions have been omitted. Biographical data have been kept at a minimum, for many persons more material is available in the 'Personalia' file at the Rijksherbarium.

ADELBERT, A. G. L. (1914 – 1972). Assistant 1943 – 1948, then on the staff of the Herbarium at Buitenzorg (now Bogor), repatriated in 1956, on the staff of the 'Museum voor het Onderwijs' at The Hague. Started work on a doctor's thesis (Lycopodium), but did not finish it because of his untimely death.

ADEMA, F. A. C. B. (1939 – x). From 1968 a temporary position on a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.), in 1971 appointed on the staff.

ARNOLDS, E. J. M. (1948 – x). In 1973 a temporary appointment as assistant.

BAAS, P. (1944 – x). Appointed 1969.

BACKER, C. A. (1874 – 1963). Teacher in the Dutch East Indies, later on the staff of the Herbarium at Buitenzorg (now Bogor). Repatriated to the Netherlands in 1931. Unofficial collaborator of the Rijksherbarium from 1945, initiator and co-author of 'Flora of Java', of which an emergency edition was published by the institute.

BAKHUIZEN VAN DEN BRINK, R. C. (jr.) (1911 – x). Assistant 1943 – 1948, then scientific officer. Posted with Flora Malesiana Foundation at Leiden 1949 – 1952. Retired in 1976.

BALGOOY, M. M. J. VAN (1932 – x). Appointed 1964, at first on a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.), but in the same year on a staff-position.

BARKMAN, J. J. (1922 – x). Scientific assistant in temporary position 1943 – 1945, afterwards scientific officer till departure to Wijster (1957) where he became director of the Biological Station, belonging to the Agricultural University at Wageningen. Continued, however, his lectures at Leiden as a part-time docent till 1973.

BAS, C. (1928 – x). Assistant 1953 – 1954, then scientific officer.

BERNARD, C.-J. (1876 – 1967). Coming from Geneva, was conservator in 1903 – 1904, left then for Dutch East Indies.

BEUSEKOM, C. F. VAN (1940 – x). Botanist for Flora of Thailand project, paid by the Dutch Directorate International Technical Aid, 1967 – 1971. Then appointed at Rijksherbarium, took position in Dutch Nature Conservation in 1974.

BLUME, C. L. (1796 – 1862). After a stay in Java 1818 – 1826, where he was deputy-director first, director later of the Botanical Garden at Buitenzorg (now Bogor), from the foundation in 1829 till his death in 1862 director of the Rijksherbarium with the personal title of professor.

BOERLAGE, J. G. (1849 – 1900). After obtaining doctor's degree in 1875 school-teacher, in 1880 (or possibly 1881) conservator at the Rijksherbarium, 1894 deputy director and lecturer ('privaat-docent') at the university, 1896 went to Buitenzorg (now Bogor), died on expedition in Moluccas.

BRAND, A. M. (1948 – x). From 1979 a temporary position, supported by a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.).

BRUMMELEN, J. VAN (1932 – x). Worked at the Rijksherbarium from 1959 on a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.), in 1962 appointed on the staff.

BRUIJN, Miss H. L. G. DE (? – ?). Temporary assistant 1908 – 1909. Later became a phytopathologist at Wageningen.

BURCK, W. (1848 – 1910). Teacher in Netherlands and Dutch East Indies, in 1881 deputy-director of the Botanical Gardens and Head of the Herbarium at Buitenzorg (now Bogor), retired in 1902. For a short period conservator of the Rijksherbarium, till January 1st, 1903. The intention seems to have been that he would get the readership that later came to Lotsy. His state of health may have been the reason that this plan was frustrated.

COOL, Miss C. (1874 – 1928). From 1914 working at the Rijksherbarium as conservator for the collection of the Dutch Mycological Society, paid a small fee by the Society. Temporary assistant from 1921 till her death, actually doing a conservator's job for the Fungi.

DISSEL, (E.?) VAN (? – ?). Was in 1853 assistant or conservator, for a short period only.

DONK, M. A. (1908 – 1972). Teacher in Dutch East Indies, afterwards (from 1941) on the staff of the Herbarium at Buitenzorg (now Bogor). In 1956 lecturer ('docent') in mycology at Leiden and honorary collaborator at the Rijksherbarium. In 1960 senior scientific officer.

FISCHER, J. B. (1804 – 1832). Assistant and collaborator of Blume, co-author of Flora Javae, arranged with Von Siebold the transfer of the collections from Brussels to Leiden. He must have been appointed shortly after the foundation of the institute, staying on till his death.

GEESINK, R. (1945 – x). Botanist for Flora of Thailand project, paid by NUFFIC from international technical aid funds. Appointed at the Rijksherbarium in 1976.

GODDIJN, W. A. (1884 – 1960). Assistant in 1909, conservator in 1910, September 1934 professor of pharmacography at Leiden (till his retirement in 1952). Acting director between Goethart's retirement and Lam's arrival (1932 – 1933).

GOETHART, J. W. C. (1866 – 1938). Appointed as conservator in 1897, acting director after death of Suringar and again after departure of Lotsy. In 1910 appointed director and reader ('lector') at the university. Retired in 1932.

GRAAFF, N. A. VAN DER (1945 – x). In 1973 working at the Rijksherbarium under an Additional Employment Scheme.

GROENHART, P. (1894–1965). Teacher in the Dutch East Indies. Worked (without an appointment) at the Rijksherbarium 1935–1936 and 1946–1947. After 1947 on the staff of the Bogor Herbarium, returned to Holland in 1955 and worked as an unpaid collaborator on his collection of lichens.

HALL, H. VAN (1830–1890). Appointed conservator 1853, dismissed 1862 after Blume's death, then Inspector of Foods and afterwards teacher in secondary school.

HALLIER, J. G. (1868–1932). Wrote under the name H(ans) Hallier. Started work at the Rijksherbarium ultimo 1908 after stays in Germany and Buitenzorg, appointed conservator 1909, obviously never in a permanent position but always temporary. Dismissed in 1922, after conflict with Goethart.

HAM, R. W. J. M. VAN DER (1951–x). Temporary part-time position at the Rijksherbarium from 1977, with a grant from the Ministry of Culture etc.

HARTOG, C. DEN (1931–x). Position on the staff of the Delta Institute for Hydrobiological Research at Yerseke, the Netherlands. Appointed at the Rijksherbarium 1963. Was for a time extra-ordinary professor at Brussels. Appointed professor at Nijmegen, the Netherlands, in 1973.

HATTINK, TH. A. (1946–x). Temporary position at the Rijksherbarium from 1977, financed by the Province of South-Holland.

HEEL, W. A. VAN (1928–x). Appointed 1956.

HEIMANS, J. (1889–1978). Professor at Amsterdam, after his retirement as such (1960) honorary collaborator at the Rijksherbarium.

HELD, Miss A. J. DEN (1944–x). From 1973 to 1976 part-time scientific officer for the teaching of plant ecology (docent).

HENNIPMAN, E. (1937–x). Assistant 1962, scientific officer in 1965.

HENRARD, J. TH. (1881–1974). Assistant 1916–1921, then conservator till his retirement in 1946, unofficial collaborator afterwards. From 1940 till 1946 also lecturer ('privaat docent') at the university.

HEUKELS, P. (1948–x). Temporary position at the Rijksherbarium from 1977, with a grant from the Ministry of Culture etc.

HILDEBRAND, F. H. (1900–1975). Worked in the Forestry Service in Java from 1917 to 1954, mostly in the Forestry Research Institute. Expert on identification of trees, worked 1963–1972 at the Rijksherbarium.

HOEK, C. VAN DEN (1933–x). Appointed 1960, departed 1966 when appointed as professor at Groningen.

HOOGLAND, R. D. (1922–x). On the staff of Flora Malesiana Foundation at Leiden 1949–1952, then to C.S.I.R.O. at Canberra (Australia), later to Austr. Nat. University at Canberra.

HOU, D. (1921–x). On the staff of Flora Malesiana Foundation at Leiden 1956–1960, then transferred to the staff of the Rijksherbarium.

HUIJSMAN, H. S. C. (1900–x). Oculist and amateur mycologist. Appointed honorary collaborator at the Rijksherbarium in 1955, retired as such per 1 January 1979.

JACOBS, M. (1929–x). Assistant with Flora Malesiana Foundation at Leiden 1954–1955, on the staff of the Herbarium at Bogor 1955–1959, then again to F. M. Foundation at Leiden. In 1961 transferred to the Rijksherbarium.

JANSE, J. M. (1860–1938). From 1890 to 1899 on the staff of the Botanical Gardens, Buitenzorg (now Bogor). Professor of botany at Leiden since 1899, and director Rijksherbarium as well, the latter only to 1906, the former till his retirement in 1930.

JANSEN, P. (1882 – 1955). Schoolteacher and amateur botanist, doctor honoris causa at Leiden university in 1946 (together with two other distinguished students of the Dutch Flora, viz. A. W. Kloos and W. H. Wachter). Honorary collaborator of the Rijksherbarium from 1948 till his death.

JONCHEERE, G. J. DE (1909 – x). Businessman (director of shipping company) and amateur pteridologist. In 1974 appointed as honorary collaborator of the Rijksherbarium.

JONGMANS, W. J. (1878 – 1957). Unpaid position in 1906, conservator in 1907. Since c. 1910 put at the disposal of the 'Dienst Rijksopsporing Delfstoffen' (the Mineral Survey) and in 1919 transferred to the Geological Survey.

JÜLICH, W. F. B. (1942 – x). Position at the Botanical Museum, Berlin from 1969 to 1973, then appointed at the Rijksherbarium.

KALKMAN, C. (1928 – x). After some years as forest botanist in Netherlands New Guinea appointed as scientific officer in 1959. From 1963 to 1965 on the staff of Laboratory Experimental Taxonomy, then back to the Rijksherbarium. In 1972 professor and director of the Rijksherbarium.

KANIS, A. (1934 – x). Assistant 1962 – 1965, went to Borneo (Sandakan herbarium) and afterwards to Australia (1969, C.S.I.R.O.).

KERN, J. H. (1903 – 1974). Teacher in primary schools in the Netherlands. On the staff of the Herbarium at Bogor 1949 – 1952, then on the staff of Flora Malesiana Foundation at Leiden, in 1957 transferred to the Rijksherbarium. Retired in 1969 and appointed as honorary collaborator. Doctor honoris causa (Nijmegen, Netherlands) in 1970.

KITS VAN WAVEREN, E. (1906 – x). Internist at Amsterdam, amateur mycologist. In 1970 appointed honorary collaborator of the Rijksherbarium.

KLOOS, A. W. (1880 – 1952). Teacher in a technical school and amateur botanist. Doctor honoris causa of Leiden university in 1946 (see sub P. Jansen). Honorary collaborator of the Rijksherbarium in 1948.

KNAAP née VAN MEEUWEN, Mrs. M. S. (1936 – x). Prepared a doctor's thesis at the Rijksherbarium, in 1965 supported by a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.).

KNOCK, J. (1904 – ?). Scientific assistant 1936 – 1938 under an Employment Scheme.

KORTHALS, P. W. (1807 – 1892). Member of the 'Natuurkundige Commissie' (Natural Science Commission) 1830 – 1843, the period 1837 – 1843 working on his notes in Holland. As preparation for his journey to Java he worked in the Rijksherbarium in 1830.

KOSTER, Miss J. TH. (1902 – x). After some years as unpaid assistant, in 1934 appointed as scientific assistant, in 1946 conservator. Retired in 1967.

KOSTERMANS, A. J. G. H. (1907 – x). Botanist at the Forest Research Institute, Bogor. From 1974 till 1978 working at the Rijksherbarium as 'B. A. Krukoff botanist of Malesian botany'.

LAM, H. J. (1892 – 1977). On the staff of the Herbarium at Buitenzorg (now Bogor), Dutch East Indies, till 1933. Then extra-ordinary professor at Leiden and director of the Rijksherbarium. In 1945 ordinary professor. Retired 1962.

LEENHOUTS, P. W. (1926 – x). Assistant 1950 – 1953. Then on the staff of Flora Malesiana Foundation at Leiden, till 1961 when he was transferred to the Rijksherbarium.

LEK, B. TH. VAN DER (?–?). Temporary assistant 1908–1909, then amanuensis, in 1912 dismissed on request taking a position in the Dutch East Indies.

LEK, H. A. A. VAN DER (1881–1955). From 1910 till 1913 conservator for the collection of the Dutch Mycological Society in the Rijksherbarium, paid by the Society. Later a research position at Wageningen.

LOERAKKER, W. M. (1949–x). From 1977 till 1978 working at the Rijksherbarium under an Additional Employment Scheme, in 1978 a temporary position on a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.).

LOOS, Miss C. DE (?–?). Temporary assistant 1909–1910, continued afterwards for unknown period as unpaid position.

LOTSY, J. P. (1867–1931). After stay in U.S.A. and Java reader ('lector') at Leiden from 1904. In 1906 appointed director of the Rijksherbarium, which he 'lifted from its decline' according to an article in a newspaper of 1907. Had ambitious plans indeed, but resigned in 1909, when the plans for a new building including experimental grounds were not accepted. Became secretary of the Hollandsche Maatschappij van Wetenschappen.

LÜTJEHARMS, W. J. (1907–x). Assistant 1929–1934, then senior assistant till his dismissal in 1938 because of an appointment as professor at Bloemfontein (S. Africa).

MAAS GEESTERANUS, R. A. (1911–x). In 1942 assistant, in 1946 conservator. Retired in 1976.

MEER, Miss J. H. H. VAN DER (later Mrs. VAN DE LAAR) (1893–x). In 1936 for some months replacing Lütjeharms during his stay in the Dutch East Indies. Phytopathologist, a.o. in Medan.

MEEUSE, A. D. J. (1914–x). Assistant 1938–1939 (botanical trip with Lam to Africa), assistant for Flora of Java 1939–1942, then technologist at Fibre Research Institute, from 1952 in Pretoria (S. Africa), from 1960 professor at Amsterdam.

MENNEMA, J. (1930–x). Teacher in secondary school, appointed at the Rijksherbarium 1965.

MERKUS, Miss E. (1946–x). Temporary position at the Rijksherbarium from 1972 till 1975, on a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.).

MEIJDEN, R. VAN DER (1945–x). Appointed 1969.

MEIJER, W. (1923–x). In 1958 and 1959 honorary collaborator at the Rijksherbarium, afterwards forest botanist in Sabah, later associate professor at Lexington, U.S.A.

MEIJER, ... (?–?). Assistant between 1854 and 1856, then resignation because of the poor salary.

MIQUEL, F. A. W. (1811–1871). Professor at Utrecht from 1859. Director of the Rijksherbarium (honorary) 1862–1871.

MOLKENBOER, J. H. (1816–1854). Physician at Leiden, friend of Reinwardt, author of Flora Leidensis 1840, conservator herbarii of the Botanical Society of the Netherlands 1845–1852. Had in the forties some position at the Rijksherbarium, according to the annual reports from 1840 to 1844, or possibly to 1846. It is not clear whether this was a paid position or a honorary one.

MONOD DE FROIDEVILLE, C. (1896–1978). Government official (Civil Service) in the Dutch East Indies, amateur botanist, specializing in grasses. From 1957 till his death honorary collaborator of the Rijksherbarium.

MULLER, J. (1921–x). Self-made palynologist a.o. working with Shell in Venezuela, Borneo, and Rijswijk (head of the Palynological Laboratory). Appointed at the Rijksherbarium in 1967. Doctor honoris causa (University of Amsterdam) in 1979.

NOORDELOOS, M. E. (1949–x). Temporary position at the Rijksherbarium (assistant) from 1976.

NOOTEBOOM, H. P. (1934–x). In 1976 transferred from the Laboratory of Experimental Taxonomy, Leiden, to the Rijksherbarium.

OOSTSTROOM, S. J. VAN (1906–x). Assistant in 1934, conservator in 1941. Retired and honorary collaborator in 1971. From 1951 to 1953 also reader ('lector') at Leiden university.

PIEROT, J. (1812–1841). According to the annual report since 1831 connected with the Rijksherbarium and earlier with the Academic herbarium at Leiden. Sometimes written as Pierrot but Blume named a genus Pierotia after him. Still at the Rijksherbarium in 1840. In 1841 sent to Decima, Japan, for Von Siebold's Company, died on his way out.

PLATE, Mrs. C. L. (1950–x). On the staff of the Central Bureau of Statistics, from 1977 posted part-time at the Rijksherbarium (editorial committee for the 'Atlas of the Dutch Flora').

PRINS, D. (1941–x). From 1977 till 1978 working on the Rijksherbarium under an Additional Employment Scheme.

PRUD'HOMME VAN REINE, W. F. (1941–x). Appointed 1966.

PIJL, L. VAN DER (1903–x). Teacher in secondary schools in the Netherlands and the Dutch East Indies. Repatriated in 1954, extra-ordinary professor (flower biology) at Nijmegen university in 1969. From 1957 to 1963 honorary collaborator of the Rijksherbarium.

QUENÉ née BOTERENBROOD, Mrs. A. J. (1930–x). Temporary part-time position at the Rijksherbarium from 1972, financed by the Province of South-Holland.

REICHGELT, TH. J. (1903–1966). Teacher in primary school. Appointed scientific officer at the Rijksherbarium in 1954.

RIDSDALE, C. E. (1944–x). Position at the Division of Botany, Lae, Papua New Guinea. From 1972 working at the Rijksherbarium as 'B. A. Krukoff botanist of Malesian botany'.

ROYEN, P. VAN (1923–x). Appointed 1951, left for Lae (Papua New Guinea) in 1962. From 1967 at B. P. Bishop Museum, Honolulu.

RUBERS, W. V. (1944–x). Temporary position at the Rijksherbarium from 1976, on a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.).

SCHULTES, ... (?–?). Son of Austrian botanist J. A. Schultes whose herbarium was sold to Blume. In 1846 appointed as conservator, probably as a kind of compensation, left between 1850 and 1854.

SCHUURMANS STEKHOVEN, J. H. (1821–1908). Appointed 1840, soon left and studied philology.

SLEUMER, H. O. (1906–x). Positions in Berlin and Tucuman. On the staff of Flora Malesiana Foundation at Leiden 1953–1956, then transferred to the Rijksherbarium. Retired and honorary collaborator in 1971.

SLOOTEN, D. F. VAN (1891–1953). On the staff of the Herbarium at Buitenzorg (now Bogor), at last acting director of the Botanical Gardens. Retired in 1951 and worked in the Royal Tropical Institute, Amsterdam. Was from 1951 to his death honorary collaborator of the Rijksherbarium (Flora Malesiana) but without official appointment.

SMEETS, ... (?–?). Assistant from 1856 to 1868 or later. Was the only staff-member staying under Miquel.

SMITH, J. J. (1867–1947). Various positions on the staff of the Botanical Gardens and the Herbarium at Buitenzorg (now Bogor). Doctor honoris causa (Utrecht) in 1910. Returned to the Netherlands in 1924. From 1929 working on orchids, his specialty, at the Rijksherbarium as an unofficial collaborator.

SOEST, J. L. VAN (1898–x). Professor of electrical engineering at the Technical University, Delft. Amateur botanist, specializing a.o. in Taraxacum. Honorary collaborator of the Rijksherbarium from 1948.

STAKMAN, M. C. E. (1883–1946). Assistant as successor to Goddijn in 1910 but unknown for how long. Afterwards high school teacher at Utrecht.

STEENIS, C. G. G. J. VAN (1901–x). On the staff of the Herbarium at Buitenzorg (now Bogor) till 1946, then went to the Netherlands, commissioned to develop and start Flora Malesiana. Director of F. M. Foundation and General Editor of the Flora in 1950. Succeeded Lam as director of the Rijksherbarium and professor in 1962. Retired as such, but not from his F.M. duties, in 1972.

SURINGAR, W. F. R. (1832–1898). Extra-ordinary professor of botany at Leiden since 1857, ordinary professor in 1862. Director of the Rijksherbarium from 1871 till his death.

TOMBE, F. A. DES (1884–1926). Temporary assistant 1908–1911, the last part of this period unpaid.

TOUW, A. (1935–x). Scientific officer at Wageningen 1962–1963, in the latter year appointed at the Rijksherbarium.

VALCKENIER SURINGAR, J. (1864–1932). Son of W. F. R. Suringar, Valckenier being the surname of his mother. When Suringar was away travelling in 1896, after the departure of Boerlage, Valckenier Suringar was (unofficially) acting director of the Rijksherbarium. He was possibly assistant at the Botanical Laboratory. Later he became a professor at Wageningen.

VALETON, TH. (1855–1929). Teacher at Groningen. From 1889 to 1913 attached to the Herbarium Bogoriense of which he was finally Head. Worked in a honorary position at the Rijksherbarium 1913–1915 and 1919–1928.

VELDKAMP, J. F. (1941–x). Appointed 1967.

VERNHOUT, J. H. (?–?). Temporary conservator 1908–1909.

VINK, W. (1931–x). Appointed 1962 after some years as a forest botanist in Netherlands New Guinea.

VLIET, G. J. C. M. VAN (1948–x). In 1974 a temporary position at the Rijksherbarium as scientific officer. From 1975 till 1977 working at the latter institute with a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.). Went to Groningen and later to Amsterdam (Botanical Gardens).

VOGEL, E. F. DE (1942–x). From 1971 to 1974 botanist for the project 'Seedlings of Tropical Trees' at Bogor, paid by NUFFIC from international technical aid funds. Appointed at the Rijksherbarium 1975.

VUYCK, L. (1862 – 1931). Had according to the annual report over 1896/1897 a temporary assignment at the Rijksherbarium, probably very unofficial. Pupil of Suringar, conservator herbarii of the Botanical Society of the Netherlands, teacher and later director of the Colonial Agricultural College at Deventer.

WACHTER, W. H. (1882 – 1946). Teacher of biology in secondary schools. Doctor honoris causa (Leiden) in 1946, 8 months before his sudden death.

WEEDA, E. J. (1952 – x). Temporary part-time position at the Rijksherbarium from 1977, with a grant from the Ministry of Culture etc.

WILDE, W. J. J. O. DE (1936 – x). From 1963 till 1966 exploration and educational work in African countries, financed from international technical aid funds. In 1966 appointed at the Rijksherbarium.

WILLEMSTEIN, S. C. (1943 – x). From 1975 till 1978 working at the Rijksherbarium with a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.).

WIT, H. C. D. DE (1909 – x). On the staff of Flora Malesiana at Leiden 1950 – 1953. Reader ('lector') at Leiden 1953 – 1959, combined with readership at the Agricultural University at Wageningen. In 1959 appointed full professor at Wageningen.

ZANEVELD, J. S. (1909 – x). Assistant 1938 – 1942, then became a teacher at The Hague. Afterwards at Curaçao and professor at the university of Norfolk, U.S.A. Returned to the Netherlands 1979.

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APPENDIX 2. PUBLICATIONS

It is not possible to give a list of all publications which have emanated from the Rijksherbarium in the course of one and a half centuries. At least from 1933 onwards the annual director's reports (see p. 133) contain complete lists of publications by staff, unofficial collaborators, and students.

In the present appendix four lists are given: books, serials, doctor's theses, papers on the institute. A large proportion of the scientific output, viz. the papers published in journals, have consequently not been mentioned although some of them are more voluminous than many books. Not mentioned either are the reports written by students.

On several publications more details are given in the essays of this jubilee volume.

List a. Books and papers which were available as separate publications.

Printed speeches have been included, but not student's reports with very limited circulation. Also left out were internal reports, expedition reports, and very ephemeral publications. Generally contributions and chapters in books written or edited by others have been omitted. Probably this list is, also within the restrictions given, not quite complete.

ARNOLDS, E. J. M. & R. VAN DER MEIJDEN. 1976. Standaardlijst van de Nederlandse flora 1975. Published by the Rijksherbarium. A complete list of Vascular Plant species, considered as belonging to the Dutch flora, with mention of the ecological groups to which they belong. The basis for the floristic survey of the country.

BACKER, C. A. & R. C. BAKHUIZEN VAN DEN BRINK. 1963 – 1968. Flora of Java, 3 volumes. This flora was preceded by an 'emergency edition' to safeguard the existing manuscripts by Backer during the second world war. Although after the war the argument was no longer valid, the stencilled emergency edition was completed (20 volumes, 1940 – 1961).

BALGOOY, M. M. J. VAN, 1971. Plant-geography of the Pacific as based on a census of Phanerogam genera. Blumea Suppl. 6. See also list c, p. 136.

BARKMAN, J. J. 1958. Phytosociology and ecology of cryptogamic epiphytes. The author's thesis (see p. 136) was part of this book.

BLUME, C. L. 1836 – 1849. Rumphia. Four volumes.

—— 1849 – 1857. Museum Botanicum Lugduno-Batavum. Two volumes, each in several instalments. See Van Steenis & Chew, p. 133.

—— & J. B. FISCHER. 1828 – 1851. Flora Javae. Published in 42 instalments at Brussels.

BOERLAGE, J. G. 1888. Flora. In: Algemeene Aardrijkskundige Bibliographie van Nederland. 2e deel, p. 11 – 45. In 1975 reprinted together with the part Fauna by P. P. C. Hoek, as Bibliografie Nederlandse Flora en Fauna 1753 – 1886.

BOERLAGE, J. G. 1890 – 1900. Handleiding tot de kennis der flora van Nederlandsch Indië, 3 volumes. This flora was started when Boerlage was conservator of the Rijksherbarium and continued after his departure to the Dutch East Indies (1896).

BRAND, M. & R. VAN DER MEIJDEN. 1978. Grassentabel. Determinatiesleutel voor de Nederlandse grassoorten naar kenmerken van de jonge vegetatieve spruit. Published by the Rijksherbarium. A key to the Dutch grasses when not flowering.

BRUMMELEN, J. VAN, 1967. A world-monograph of the genera Ascobolus and Saccobolus (Ascomycetes, Pezizales). Persoonia Suppl. 1. See also list c, p. 136.

COOL, C. & H. A. A. VAN DER LEK. 1913. Het paddenstoelenboekje. A second edition, in two parts, was published in 1920, the third and fourth edition were prepared by Van der Lek, and were published after Miss Cool's death. Van der Lek left the Rijksherbarium in 1913.

DONK, M. A. 1961. The generic names proposed for Agaricaceae. Beihefte zur Nova Hedwigia 5. The largest paper of the series on the nomenclature of the Hymenomycetes, published between 1951 and 1964 (index), see the bibliography in Persoonia 7, 1973, 120 – 126.

—— 1974. Check list of European Polypores. Verhandelingen Kon. Ned. Akad. Wetensch., afd. Natuurk., 2e reeks, vol. 62. Published posthumously.

GEESINK, R. 1978. Key to the genera and some species of the S.E. Asiatic Leguminosae-Faboideae (Papilionaceae). Published by the Rijksherbarium.

GOETHART, J. W. C. & W. J. JONGMANS. 1902 – 1908. Planten-kaartjes voor Nederland. Published in 20 instalments of which six double ones, usually c. 20 maps per instalment.

HARTOG, C. DEN, 1970. The sea-grasses of the world. Verhandelingen Kon. Ned. Akad. Wetensch., afd. Natuurk., 2e reeks, vol. 59, nr. 1.

HEIMANS, E., H. W. HEINSIUS & J. P. THIJSSE. Geïllustreerde flora van Nederland. This flora started in 1899 and the last, 21st, edition appeared in 1965. Two staff-members of the Rijksherbarium (J. H. Kern and Th. J. Reichgelt) were involved, starting with the 18th edition of 1953.

HENNIPMAN, E. 1969. De Nederlandse Cladonia's (Lichenen). Wetensch. Mededelingen K.N.N.V. nr. 70. The outcome of a subject for the doctoral examination. The author later switched to pteridology. H. J. M. Sipman from Utrecht prepared a second edition in 1978.

HENRARD, J. TH. 1950. Monograph of the genus Digitaria. Henrard wrote papers on many grass genera, his most important works are his monograph of Aristida (part of which served as his doctor's thesis, see p. 135) and the monograph of Digitaria which was published by Universitaire Pers Leiden after his retirement.

JACOBS, M. 1972. The plant world on Luzon's highest mountains. Published by the Rijksherbarium. Report on an expedition in 1968, and a proposal to proclaim a national park in Luzon.

JANSE, J. M. 1899. De voeding der Hoogere Planten. Inaugural address, Leiden.

JONGH, S. E. DE, c.s. 1971 – 1973. Overzicht der Nederlandse Bramen. Keys, descriptions, and distribution of the Dutch species of Rubus. Published in three instalments by the Rijksherbarium (stencilled), part I by S. E. de Jongh, in collaboration with A. van de Beek, J. H. Kern, and F. M. Muller, part IIA and IIB by A. van de Beek, S. E. de Jongh and F. M. Muller.

JONGMANS, W. J. 1910–1913. Die palaeobotanische Literatur. Bibliographische Übersicht über die Arbeiten aus dem Gebiete der Palaeobotanik. 3 volumes. A forerunner of the still existing Fossilium Catalogus, II. Plantae, which started in 1913.

KALKMAN, C. 1972. Mossen en Vaatplanten. Bouw, levenscyclus en verwantschappen van de Cormophyta. A textbook for Dutch students.

—— 1973. Herbariumsystematiek. Inaugural address, Leiden university.

KOSTER, J. TH. 1949. De plantengroei van de Maleise Archipel. A translation of E. D. Merrill's Plant Life of the Pacific World (1945), adapted for use in the Netherlands Indies.

LAM, H. J. 1933. Over indeeling, verwantschap en verspreiding der planten. Inaugural address, Leiden university.

—— 1945. Fragmenta Papuana. Observations of a naturalist in Netherlands New Guinea. Sargentia 5. Abbreviated translation by Miss L. M. Perry of a number of papers (in Dutch), published between 1927 and 1929 in Natuurk. Tijdschr. Ned.-Indië.

—— 1946. Evolutie. Een poging tot synthese in algemeen begrijpelijke vorm. A small book, of less than 100 pages, with a semi-popular account of micro- and macro-evolution.

—— 1959. De groene blos onzer aarde. (Een geleide droom). Speech given at the occasion of the anniversary of the university. It was customary that each year the 'rector magnificus', then a one year's job, gave a speech in his own field of science.

—— 1962. Tradenda. Mijmeringen bij een afscheid. Speech given at the occasion of his retirement as professor and director.

LEENHOUTS, P. W. 1968. A guide to the practice of herbarium taxonomy. Regnum Vegetabile nr. 58. This guide treats, among others, the 'paper foundation' which has to be laid under taxonomic revisions in the form of card systems etc. for literature, specimens, names.

—— 1955. The genus Canarium in the Pacific. B. P. Bishop Museum Bulletin nr. 216. A part of the author's work on Burseraceae, to which family he devoted much of his attention.

LOTSY, J. P. 1906–1908. Vorlesungen über Deszendenztheorien mit besonderer Berücksichtigung der botanischen Seite der Frage gehalten an der Reichs-Universität zu Leiden. 2 volumes.

—— 1907–1911. Vorträge über botanische Stammesgeschichte, gehalten an der Reichsuniversität zu Leiden. Ein Lehrbuch der Pflanzensystematik. 3 volumes, the latter one incomplete and missing its planned second part.

MAAS GEESTERANUS, R. A. 1964–1976. De Fungi van Nederland. This is a series of contributions to the macromycetous flora of the Netherlands, published in the Wetensch. Mededelingen of the K.N.N.V. (Royal Dutch Society on Natural History). The author contributed Geoglossaceae (1964), Pezizales (1967, 1969), and the Clavarioid Fungi (1976).

—— 1971. Hydnaceous fungi of the eastern old world. Verhandelingen Kon. Ned. Akad. Wetensch., afd. Natuurk., 2e reeks, vol. 60, nr. 3.

—— 1975. Die terrestrischen Stachelpilze Europas (The terrestrial hydnums of Europe). Verhandelingen Kon. Ned. Akad. Wet., afd. Natuurkunde, 2e reeks, vol. 65. A well-illustrated account with the text in two languages, summarizing the results of many years of research in hydnaceous fungi.

MENNEMA, J. 1976. Floristisch onderzoek van vijf Haarlemse polders. Floristic composition in some polders and recommendations for the preservation of botanically important parts. Published by the Municipality of Haarlem.

MEIJDEN, R. VAN DER, 1976. Flora en landschapsbeheer tussen Venlo en Arcen. Een inventarisatieonderzoek volgens de methode-Mennema. Published by the Rijksherbarium. A floristic survey of a region in the province of Limburg with recommendations for the preservation of botanically important parts.

—— & A. ABMA. 1977. De flora van de Dordtse Biesbosch. Inventarisatieresultaten met de oude en de nieuwe florastatistiek. Published by the Rijksherbarium. A floristic survey of a region in the province of Zuid-Holland, with some considerations on the methods of floristic evaluation.

MIQUEL, F. A. W. 1863 – 1870. Annales Musei Botanici Lugduno-Batavi. Four volumes.

—— 1870. Catalogus Musei Botanici Lugduno-Batavi. I. Flora Japonica. This was intended to become a complete catalogue of the Rijksherbarium collections. According to Miquel's last annual report before his death the volumes for British India and the Dutch East Indies were in preparation but these have never been published.

OOSTSTROOM, S. J. VAN, 1977. Flora van Nederland, 19th edition. This flora was started (under the title Geïllustreerde schoolflora voor Nederland) by H. Heukels in 1900, later continued by W. H. Wachter. Van Ooststroom became involved from the 13th edition (1949) which appeared after Wachter's death. From the 14th edition it was entirely Van Ooststroom's responsibility and the flora has now developed to the 'standard' flora for the Netherlands, often mentioned as Heukels-Van Ooststroom. A smaller, not illustrated flora started by Heukels, now under the title 'Beknopte school- en excursieflora van Nederland', has seen 12 editions up till 1968 and was from its 6th edition (1947) also edited by Van Ooststroom.

QUENÉ-BOTERENBROOD, A. J. & J. MENNEMA. 1973. Zeldzame Nederlandse plantesoorten in Zuid-Holland. Published by the Province of Zuid-Holland. Contains distribution maps and other information on rare plants in the province.

SLEUMER, H. 1969. Die Gattung Escallonia (Saxifragaceae). Verhandelingen Kon. Ned. Akad. Wetensch., afd. Natuurk., 2e reeks, vol. 58, nr. 2.

SMITH, J. J. 1967. Index to the Enumeration of the Orchidaceae of Sumatra and neighbouring islands. The Enumeration appeared in Fedde Repertorium 32, 1933, but the index was left out for reasons of economy. Separately published by the Rijksherbarium.

SOEST, J. L. VAN, 1966. A catalogue of Taraxacum Sect. Erythrosperma. Published by the Rijksherbarium.

—— 1969. Die Taraxacum-Arten der Schweiz. Veröff. Geobot. Inst. E. T. H. Stiftung Rübel, nr. 42. This honorary collaborator of the Rijksherbarium made many contributions to the knowledge of Taraxacum in Europe and Asia. This is one of his larger publications in the field.

——, J. DOEKSEN, P. JANSEN, A. A. KRUIJNE & G. J. VERVELDE (eds.). 1951. Grassen en granen. The extensive systematic part and some other chapters by P. Jansen, several chapters by Van Soest, a chapter on monstrosities by Van Ooststroom.

——, A. HAGENDIJK & H. A. ZEVENBERGEN. 1970 – 1973. Atlas of leaf shapes of Taraxacum species from the Netherlands. Published by the Rijksherbarium, in three instalments of 50 plates each.

STEENIS, C. G. G. J. VAN, 1954. Homo destruens. Inaugural address, Leiden university.

—— 1972. Overdenkingen. Speech given at the occasion of his retirement as professor and director of the Rijksherbarium.

—— 1972. Mountain flora of Java, containing 57 plates with pictures of 456 species of Flowering Plants native in the mountains of Java, made from living specimens in colour by Amir Hamzah and Moehamad Toha. Publication of this book had to wait for 30 years after completion of the beautiful plates.

—— & M. M. J. VAN BALGOOY (eds.). 1966. Pacific Plant Areas, vol. 2. Blumea Suppl. 5. See also list b, p. 135.

—— & W. L. CHEW. 1974. Index to C. L. Blume, Museum botanicum Lugduno-Batavum vol. 2 (1856–1857). Separately published by the Rijksherbarium to enhance the accessability of Blume's book which lacks an index.

SURINGAR, W. F. R. 1870. Handleiding tot het bepalen van de in Nederland wildgroeiende planten voor schoolgebruik en botanische wandelingen. This flora has known 14 editions, from the 3rd edition the main title has been 'Zakflora'. Up till the 8th edition (1895) it was revised by Suringar, after his death editing was done by A. J. M. Garjeanne (9th), H. J. Calkoen (10th–12th), L. Vuyck (13th and 14th).

—— 1889. De kruidkunde in Nederland. Opening speech of the 2nd Dutch Congress for Science and Medicine (Tweede Nederlandsch Natuur- en Geneeskundig Congres), held at Leiden.

VOGELENZANG, L. (editor). 1973. Collected mycological papers from P. A. Karsten. 4 volumes. Almost 3000 pages, reprinted and chronologically arranged by the librarian of the Rijksherbarium, who had quite a job in bringing the material together.

—— (editor). 1978. Collected mycological papers from N.-T. Patouillard. 3 volumes, 2400 pages.

WILLEMSTEIN, S. C. 1978. List of flowers visited by Cetoniidae (Coleoptera) and Central European Cerambycinae and Lepturinae (Col., Cerambycidae), based on historical and pollen analytical research. Published by the Rijksherbarium.

List b. Serials, published and/or edited by the Rijksherbarium.

ANNUAL REPORTS. From the very beginning the directors of the Rijksherbarium had the obligation to submit annual reports, first to the Minister, later to the Board of Curators of the University. Most of the annual reports could be recovered in some way, partly in the archives of the Rijksherbarium, partly (mainly through the investigations of mr. A. den Ouden) at the State Archives at The Hague. They are a mine of information, although variable in length and contents. Especially Janse excelled in brevity and non-committal contents. The reports are in Dutch, of course.

BLUMEA. Founded in 1934 as successor to the Mededeelingen. Sub-title: 'A journal of plant-taxonomy and plant-geography'.

CORRESPONDENTIEBLAD ten dienste van de floristiek en het vegetatie-onderzoek van Nederland. A stencilled bulletin, issued from 1956 till 1961, and succeeded by Gorteria.

FLORA MALESIANA. Published under the auspices of the Botanical Garden at Bogor, Indonesia, and the Rijksherbarium by a commercial publisher, viz. Sijthoff & Noordhoff International Publishers.

FLORA MALESIANA BULLETIN was originally a publication from the Foundation Flora Malesiana, as were the Flora Malesiana Miscellaneous Records and the Identification Lists (see there). The Bulletin gives a wealth of information about all aspects of descriptive botany, pure and applied, relevant to the tropical Asiatic-Australian-Pacific region. Number 1 was published in 1947, as so many other things it grew and grew and now each year a volume of about 200 pages is produced. Number 31 appeared in 1978. As corollary to the integration of the F.M. staff and the F.M. research programme in the Rijksherbarium the Bulletin is now published by the latter.

FLORA MALESIANA MISCELLANEOUS RECORDS. The series is intended for publication of provisional or preliminary papers, which are expected to be succeeded or replaced before long. Four numbers have been issued, in 1959, 1960, 1973, and 1976 respectively. The booklets are stencilled.

FLORA NEERLANDICA. This is a publication of the Royal Botanical Society of the Netherlands (K.N.B.V.), started in 1948 when the society commemorated its centenary. Pteridophytes. Gymnosperms, and Monocots were published without too many difficulties, the treatment of the Dicots is very much delayed. Staff-members of the Rijksherbarium were and are members of the editorial committee and the Flora is often seen to be a kind of duty for the institute. Other tasks prevent full-scope activity in this direction. The flora is written in Dutch.

GORTERIA. Started in 1961 and still the most important vehicle for publication of especially floristic, but also more ecological, papers on the Dutch flora and vegetation. Not only professional botanists, but many amateurs contribute to the journal. Papers are in Dutch, mostly with English summary.

IAWA BULLETIN. Published by the International Association of Wood Anatomists. Starting from 1977 this bulletin is published at the Rijksherbarium.

IDENTIFICATION LISTS OF MALAYSIAN SPECIMENS. Up till now 56 lists have been published, stencilled or in offset. In most cases not only the specimens from Malesia proper have been mentioned in these lists, but also those from continental Asia, the Australian region, and sometimes even a larger area. The idea behind the series is to provide curators of herbaria with the means to name duplicates which were not seen and identified by the monographer.

LEIDEN BOTANICAL SERIES is published by Leiden University Press. It is a medium for papers of a monographic nature which by their length are unsuitable for publication in a journal. Editors are nominated by the director of the Rijksherbarium and in a sense the series is the continuation of the Supplements to Blumea (and Persoonia). Number 1 appeared in 1975, number 4 in 1978.

MEDEDEELINGEN VAN 'S RIJKS HERBARIUM. The first journal published by the Rijksherbarium, founded in 1910 and going on till 1933.

MUSÉE DE BOTANIQUE. A serial initiated by Suringar, but not very successful.

NOVA GUINEA. This journal has a rather complicated publication history. There have been three series. From 1955 H. J. Lam was editor-in-chief of the second series ('New Series'). The third series, started in 1960, was divided into botany, zoology, geology, and anthropology. The Botany series was also under editorship of H. J. Lam (later together with H. O. Sleumer) and went through

24 numbers before terminating in 1966; it was published by E. J. Brill, Leiden, as were the earlier series.

PACIFIC PLANT AREAS. As explained in more detail in Van Balgooy's paper this serial was proposed by Lam and realized by Van Steenis. The series is now under editorship of M. M. J. van Balgooy. Mrs. M. J. van Steenis-Kruseman was an important collaborator. Three volumes appeared, the first one (1963) was published by the Philippines National Institute of Science and Technology, the Rijksherbarium published volumes 2 (1966) and 3 (1975).

PERSOONIA. Founded in 1959 with the sub-title: 'a mycological journal'.

PROGRESSUS REI BOTANICAE. Edited for the Association Internationale des Botanistes by the association's secretary, J. P. Lotsy. This forerunner of the Fortschritte der Botanik (now: Progress in Botany) started in 1907, the fifth and last volume was published in 1917.

List c. Dissertations.

The doctor's theses which have sprung from the Rijksherbarium cradle, were for a large part produced by staff-members, others by guest-workers of various kind.

'Promotor' (term used in Dutch universities for the professor taking the responsibility for the thesis) was most of the time the director of the Rijksherbarium, at least when this official was also professor of the university. In some cases, where someone else was promotor, this has been mentioned.

Some pupils of Suringar have been left out (M. W. Beijerinck, M. Treub, H. de Vries), since the subjects of their theses do not bear much relationship to the research at the Rijksherbarium, but are more from the field of 'general botany' which was also under the wings of Suringar. Burck, Boerlage, Vuyck, and Valckenier Suringar, also students of Suringar, have been entered in the list, on the other hand.

The list is probably complete. The order is chronological.

HALL, H. VAN, 1858. Observationes de Zingiberaceis. Promotor was probably W. H. de Vriese.

BURCK, W. 1874. Over de ontwikkelingsgeschiedenis en den aard van het indusium der Varens.

BOERLAGE, J. G. 1875. Bijdrage tot de kennis der houtanatomie.

VUYCK, L. 1898. De plantengroei der duinen. Vuyck was assistant at the Botanical Laboratory and in the period 1896/97 he had some kind of temporary job at the Rijksherbarium. Because of the nature of the subject (dune vegetation) it is a Rijksherbarium thesis.

VALCKENIER SURINGAR, J. 1898. Het geslacht Cyperus (sensu amplo) in den Maleischen Archipel.

GODDIJN, W. A. 1926. Kweekproeven met eenjarige vormen binnen Linné's soort Hyoscyamus niger. (Also published in Genetica 8). Promotor was L. van Itallie, professor of pharmacy at Leiden.

HENRARD, J. TH. 1929. Monograph of the genus Aristida, I. (Also published as Meded. Rijks Herb. 58). Promotor was A. A. Pulle and the graduation was in Utrecht. The work, however, was performed while Henrard was in service with the Rijksherbarium. Why Janse, who retired in 1930, or another professor at Leiden, was not acting as promotor, I cannot guess. Goddijn does not throw any light on the matter in his short biographic paper in Blumea, Suppl. 3, 1946, 4–6.

KOSTER, J. TH. 1935. The Compositae of the Malay Archipelago. I. Vernonieae and Eupatorieae. (Also published in Blumea 1).

LÜTJEHARMS, W. J. 1936. Zur Geschichte der Mykologie. Das XVIII. Jahrhundert. Promotor was L. G. Baas Becking, professor of general botany, not Lam. Since Lütjeharms had been on the staff of the Rijksherbarium since 1929, his thesis has been included in the present list. (Also published as Meded. Ned. Mycol. Ver. nr. 23).

ZANEVELD, J. S. 1941. The Charophyta of Malaysia and adjacent countries. The graduation was planned for December 1940, but the University was closed by the German occupation authorities on November 27th. This caused a postponement till May 1941. The paper was published in Blumea 4, 1940.

MAAS GEESTERANUS, R. A. 1947. Revision of the Lichens of the Netherlands. I. Parmeliaceae. (Also published in Blumea 6).

HOOGLAND, R. D. 1952. A revision of the genus Dillenia (Also published in Blumea 7).

BARKMAN, J. J. 1958. On the ecology of Cryptogamic epiphytes, with special reference to the Netherlands.

LEENHOUTS, P. W. 1959. A monograph of the genus Canarium (Burseraceae). (Also published in Blumea 9).

HOEK, C. VAN DEN, 1963. Revision of the European species of Cladophora.

KALKMAN, C. 1965. The Old World species of Prunus subg. Laurocerasus, including those formerly referred to Pygeum. (Also published in Blumea 13).

JACOBS, M. 1965. The genus Capparis (Capparaceae) from the Indus to the Pacific. (Also published in Blumea 12).

HEEL, W. A. VAN, 1966. Morphology of the androecium in Malvales. (Also published in Blumea 13).

BORSSUM WAALKES, J. VAN, 1966, Malesian Malvaceae revised. (Also published in Blumea 14).

BRUMMELEN, J. VAN, 1967. A world-monograph of the genera Ascobolus and Saccobolus (Ascomycetes, Pezizales). (Also published as Persoonia, Suppl. 1).

PAYENS, J. P. D. W. 1968. A monograph of the genus Barringtonia (Lecythidaceae). (Also published in Blumea 15).

KANIS, A. 1968. A revision of the Ochnaceae of the Indo-Pacific area. (Also published in Blumea 16).

BAS, C. 1970. Morphology and subdivision of Amanita and a monograph on its section Lepidella. (Also published in Persoonia 5).

KNAAP-VAN MEEUWEN, M. S. 1970. A revision of four genera of the tribe Leguminosae-Caesalpinioideae-Cynometreae in Indo-Malesia and the Pacific. (Also published in Blumea 18).

VINK, W. 1970. The Winteraceae of the Old World. I. Pseudowintera and Drimys – morphology and taxonomy. (Also published in Blumea 18).

WILDE, W. J. J. O. DE, 1971. A monograph of the genus Adenia Forsk. (Passifloraceae). (Also published as Meded. Landbouwhogeschool Wageningen 71 – 18).

TOUW, A. 1971. A taxonomic revision of the Hypnodendraceae (Musci). (Also published in Blumea 19).

BALGOOY, M. M. J. VAN, 1971. Plant-geography of the Pacific as based on a census of Phanerogam genera. (Also published as Blumea, Suppl. 6).

BEUSEKOM, C. F. VAN, 1972. Revision of Meliosma (Sabiaceae), section Lorenzanea excepted, living and fossil, geography and phylogeny. (Also published in Blumea 19).
VELDKAMP, J. F. 1973. A revision of Digitaria Haller (Gramineae) in Malesia. (Also published in Blumea 21).
BAAS, P. 1975. Comparative anatomy of Ilex, Nemopanthus, Sphenostemon, Phelline, and Oncotheca. (Also published in Blumea 21).
NOOTEBOOM, H. P. 1975. Revision of the Symplocaceae of the Old World, New Caledonia excepted. (Also published as Leiden Bot. Series nr. 1).
MERKUS, E. 1977. De ultrastructuur van de ascosporewand bij Pezizales(Ascomyceten). (Composed of 4 papers also published in Persoonia 7, 8, and 9).
HENNIPMAN, E. 1977. A monograph of the Fern genus Bolbitis (Lomariopsidaceae). (Also published as Leiden Bot. Series nr. 2).

List d. Publications on the institute.
Articles in newspapers have not been included.

GOETHART, J. W. C. 1932. De aanslag op ons nationale Staatsherbarium. Een landsbelang in gevaar.
GODDIJN, W. A. 1931. 's Rijks Herbarium 1830–1930. This is the largest paper in the 'Herdenkingsuitgave bij gelegenheid van de honderdjarige vestiging te Leiden' (Commemoration volume at the occasion of the centenary of the establishment at Leiden), which consisted of Mededeelingen 's Rijks Herbarium nrs. 62–69.
HALL, H. VAN, 1862. De Minister Mr. J. R. Thorbecke en het Rijksherbarium in 1852 en 1862.
—— 1862. Open brief aan Mr. J. R. Thorbecke. These two pamphlets contain a protest against the dismissal of Van Hall.
JACOBS, M. 1973. Schets van de activiteiten van het Rijksherbarium anno 1973. A short exposé of the research and other work executed. An extended and updated version of a series of articles in the Leids Universiteitsblad of 1965.
JANSE, J. M. 1908. Rede gehouden bij de opening van het Botanisch Laboratorium der Rijks-Universiteit te Leiden. In this speech, held when the new Botanical Laboratory was officially opened, there are also remarks on the Rijksherbarium.
KLOOS, A. W. 1948. De geschiedenis en betekenis van het Rijksherbarium. Universum, pp. 659–663.
LAM, H. J. 1935. The National Herbarium (Rijksherbarium). In: M. J. Sirks, Botany in the Netherlands, pp. 10–13. Written for the 6th International Botanical Congress, Amsterdam.
—— 1945. The Rijksherbarium during the war. Blumea 5: 426–436.
—— 1959. A tale of two cities: Singapore and Leiden. Gard. Bull. Sing. 17: 166–170. At the occasion of the 100th anniversary of the Singapore Botanic Gardens.
MOURIK, B. A. VAN. 1949. Universitatis Leidensis. In this well-illustrated book on the life and work of the University the Rijksherbarium is discussed on pp. 111–113.
STEENIS-KRUSEMAN, M. J. VAN, 1962. The transfer of the Rijksherbarium from Brussels to Holland in 1830. Blumea 11: 505–508.

INDEX TO PERSONAL NAMES

Not entered in this index are the collectors etc., mentioned in the essay by Mrs. Van Steenis-Kruseman (see index on p. 52). References to the Appendices are also omitted from this index.